1555

Water Treatment Optimization Study

AMHERSTBURG AREA WATER SUPPLY SYSTEM

May 1991

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WATER PLANT OPTIMIZATION STUDY

Amherstburg

Amherstburg Area Water Supply System

Project No. 7-2031

May 1991

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Please note that some of the recommendations contained in this report may have already been completed at time of publication. For more information, please contact the local municipality, or the Water Resources Branch of the Ministry of the Environment.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Purpose of the Water Plant Optimization Study is to prepare a document that describes the present condition of a water plant with respect to equipment and operation as well as information regarding the quantity and quality of raw and finished water. The report attempts to make recommendations that will allow the plant to operate in an optimum condition so that the best possible finished water quality is achieved with emphasis on particulate removal and disinfection. The approach is to optimize the existing facilities and make recommendations for short term and long term improvements. It is anticipated that the optimization study documents will be updated annually.

The Amherstburg Area Water Treatment Plant was designed to supply treated water to a large industrial plant as well as the residents of the Town of Amherstburg and the Townships of Anderdon, Colchester North, and Malden. The demand of the industrial complex did not materialize and as a result the plant operates at less than 50% of design capacity most of the time.

It is interesting to note an improvement in treated water turbidity during the second half of the study period. The reduced turbidity was a result of the plant staff's efforts to strive to achieve a maximum plant effluent turbidity of 0.20 FTU rather than the Provincial objective of 1.0 FTU.

Although particulate removal and disinfection at the plant are good, the following recommendations are suggested as possible means of further improving treatment efficiency and operating techniques.

Physical Improvements

- Primary and secondary flow element to be calibrated and refurbished if necessary and the changes documented.
- Install continuous flow-through turbidimeters to monitor raw water, clarifier effluent, individual filter effluents and plant effluent.
- Install calibration chambers on chemical feed pumps.
- The outdoor clarifier should be covered to reduce the effects of wind and icing.

- The means should be provided to separately measure the amount of chlorine used for pre and post-chlorination.

Studies

- Evaluate varying coagulant and coagulant aid dosages in regards to particulate removal.
- Evaluate the pacing of coagulant aid and filter aid feed rates to flow and turbidity in regards to particulate removal.
- Carry out an aluminium and pH monitoring program to determine if pH correction of raw water is warranted.
- Carry out a study to determine if installation of a streaming current meter is warranted.
- Evaluate the effectiveness on particulate removal of 1) filter to waste mode of operation, 2) filter to waste mode of operation with polymer added to backwash water and 3) varying backwash flows and duration.
- Conduct a study to determine why the plant experiences very low turbidities in October.

Other Recommendations

- Changes to filtration rates should be made gradually.
- Initiation of filter backwash should be based on filter effluent turbidity.
- All available filters should be put in service when clarifier effluent turbidities are high.
- The filter run time, cumulative volume filtered per filter, raw water turbidity, filter influent turbidity, filter effluent turbidity and plant effluent turbidity should be recorded hourly.
- The use of electronic spreadsheets should be expanded within the plant.
- Reinstate present maintenance program and annual inspection and disinfection of filters.
- Inspect pump wells and reservoir to address suspected leakage problems.
- Chemical application throughout the plant should be based on dosages rather than on the amount of chemical used per 24 hours.
- Total chlorine residuals should be measured and recorded routinely throughout the plant.

WATER PLANT OPTIMIZATION STUDY

AMHERSTBURG AREA WATER TREATMENT PLANT

ONTARIO MINISTRY OF THE ENVIRONMENT

PROJECT NO. 7-2031

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WATER PLANT OPTIMIZATION STUDY

AMHERSTBURG AREA WATER TREATMENT PLANT

ONTARIO MINISTRY OF THE ENVIRONMENT

PROJECT NO. 7-2031

INTRODUCTION AND TERMS OF REFERENCE

The purpose of the Water Plant Optimization Study (WPOS) is to document and review the present conditions and determine an optimum treatment strategy for contaminant removal at the plant, with emphasis on the removal of particulate materials and the disinfection processes.

In striving for excellence in water treatment, it is important to examine all possible approaches, but first, optimum use should be made of the processes already in place.

This optimization study is a beginning and not an end to itself. It is the start of an ongoing documentation of the operation of the plant. It is recommended that this document be updated on an annual basis.

The Ontario Ministry of the Environment has instituted a Drinking Water Surveillance Program (D.W.S.P.) consisting of a continuously updated base of information on Ontario water treatment plants and water quality. In connection with the D.W.S.P., a specific plant investigation and process evaluation study is required for each plant entering the program. The study has been prepared in accordance with a detailed protocol prepared by the Ministry of the Environment.

The Amherstburg Area Water Treatment Plant provides the water supply for the Town of Amherstburg, the Township of Anderdon and parts of the Townships of Colchester North and Malden. Serviced populations are as follows:

Town of Amherstburg	-	8,385
Townships of Anderdon & Colchester North	-	5,535
Township of Malden	-	2,118

The Optimization Study is based on plant operating data for the years 1984, 1985 and 1986.

SECTION A
RAW WATER

A.1 Source

The source of the water for the Amherstburg Area Water Treatment Plant is the Detroit River. The site is located just north of the Town of Amherstburg which is 24 km (15 mi) downstream of the Cities of Windsor and Detroit and 9 km (5.5 mi) upstream of where the river discharges into Lake Erie. The intake structure is approximately 60 m (200 ft) offshore, and water is drawn from a depth of 5.5 metres (18 ft) below mean water level, approximately 1.2 m (4 ft) above the river bed.

The nearest sanitary sewage treatment works outfall is approximately 2.5 km (1.5 mi) north of the intake where seasonal discharge from the Township of Anderdon (Edgewater Beach Area) oxidation ponds enters the river.

The location of the plant is shown on Figure No. 1.

Being downstream from the highly industrialized areas of Detroit and Windsor presents the risk of raw water contamination from industrial waste spills.[1] The Windsor Office of the Ministry of the Environment has a Contingency Plan for dealing with spills and together with the Provincial Spills Action Centre (SAC) and input from the State of Michigan, plant procedures are in place for notifying plant staff of a spill. Plant staff has been notified of spills by the SAC, Coast Guard and the Harbourmaster and the plant has been shut down as a precautionary measure on several occasions on instruction from the Windsor Office of the MOE. The amount of storage capacity allows shutdown without interruption to service.

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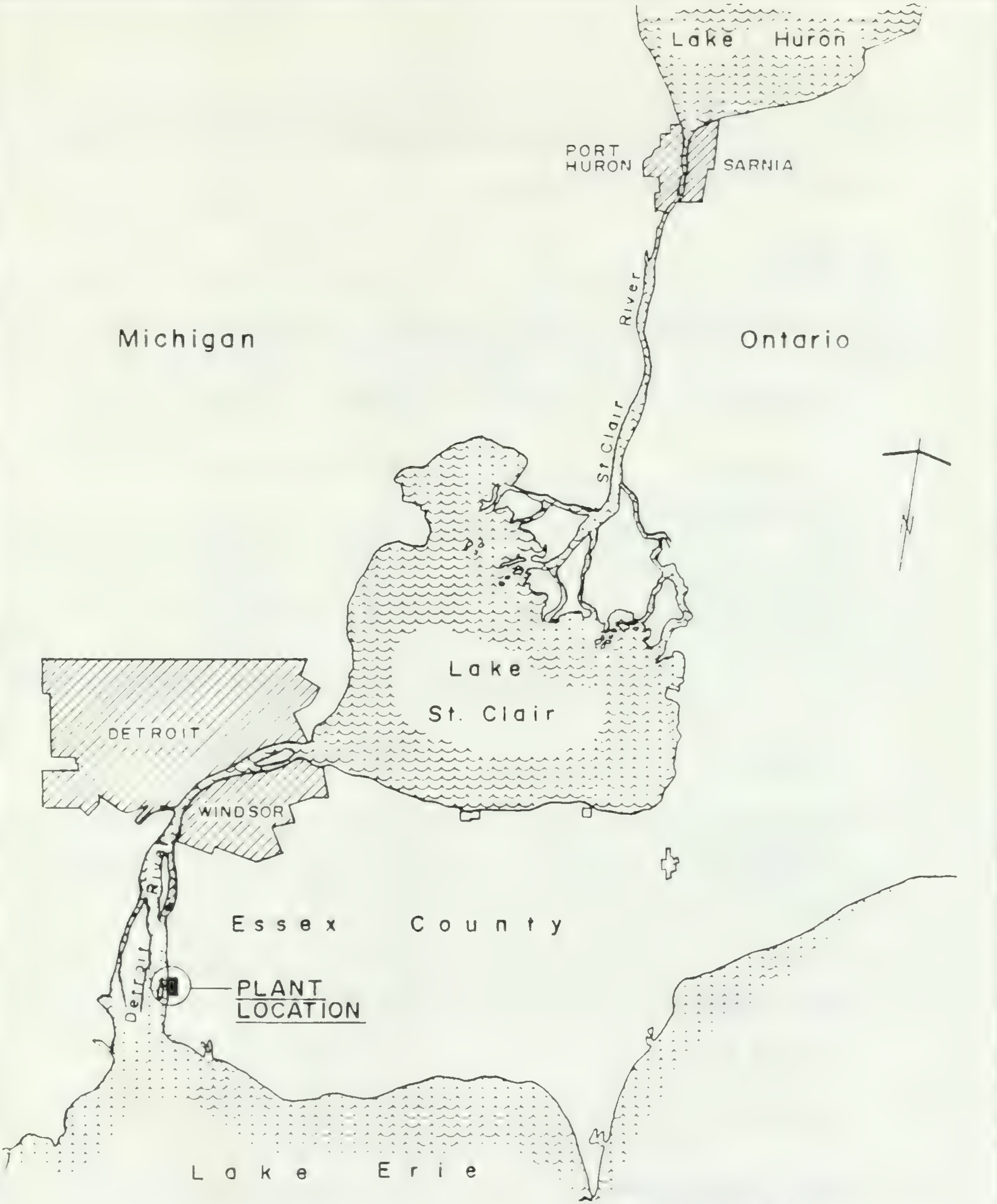
[1] The Upper Great Lakes Connecting Channels Study and The Ontario Ministry of the Environment Industrial Discharge Report itemize the numerous discharge points from municipal sewage treatment plants, combined sewer overflows and industries. The average discharge from the City of Detroit WWTP is 2,900 ML/d (638 mgd). During wet weather flows can increase to 5.455 ML/d (1,200 mgd) of which 3,660 ML/d (805 mgd) receives secondary treatment and 1,795 ML/d (395 mgd) is discharged after primary treatment with disinfection.



LOCATION MAP

WATER PLANT
OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA
WATER TREATMENT PLANT

LA FONTAINE, COWIE, BURATTO & ASSOCIATES LIMITED CONSULTING ENGINEERS	Date 1988·01·08
	File N° WR 158 A
	Figure N° 1

Additional raw water sampling and testing were carried out during the time of the "St. Clair River Blob" tetrachloroethylene spill and it did not appear to cause any degradation of raw water quality at the Amherstburg Plant.

A.2 Quality

Throughout the study period, monthly raw water physical and chemical parameters varied as follows:

Parameter	Min.	Max.	Avg.
Turbidity (FTU)	3.1	570	17
Colour (Hazen Units)	< 1	39	9
pH	7.7	8.2	7.8
Alkalinity (mg/L)	83	89	86
Hardness (mg/L)	102	117	110

Bacteriological testing of raw water yielded the following results for the study period.

Parameter	% of Samples
Total Coliforms	
0-100/100 mL	4
101-5000/100 mL	54
> 5000/100 mL	42
Fecal Coliforms	
0-10/100 mL	3
11-500/100 mL	84
> 500/100 mL	13
Fecal Streptococcus	
0-1/100 mL	1
2-50/100 mL	55
> 50/100 mL	44

SECTION B

FLOW MEASUREMENT

B.1 Raw Water Flow Measurement

Raw water flow is measured by a 300 mm (12 in) dia. venturi tube in the low lift pump discharge header. The differential pressure created by the Venturi is sensed by a pneumatic differential pressure transmitter which transmits a 21 - 103 kPa (3 - 15 psi) air signal to a circular chart recorder/totalizer on the main control panel.

B.2 Treated Water Flow Measurement

Treated water is measured by a 600 mm (24 in) diameter Sparling Propeller Meter with flow totalized on the meter head. In addition, a pulse signal is transmitted to a circular chart flow recorder/totalizer on the main control panel. The range of the flowmeter is 76 to 1,009 L/sec (1,000 - 13,320 gpm) with a published accuracy of 2%. The minimum plant output is 127 L/sec (1,675 gpm).

B.3 Backwash Water Flow Measurement

Main backwash water flow is measured by a 400 mm (16 in) diameter venturi tube installed in the discharge piping of the washwater pump. A pneumatic system similar to that for raw water flow indicates and totalizes mainwash water flow on the filter control console.

Flow to the surface agitators is measured by a 150 mm (6 in) diameter venturi tube. A pneumatic system similar to the raw water system indicates and totalizes surface wash water flow on the filter control console.

B.4 Filter Flow Measurement

Flow through each filter is measured by a 300 mm (12 in) diameter venturi tube using a pneumatic control system to record and totalize the flow on the main control panel.

B.5 Validity of Flow Measurement

a) Venturi/Pneumatic Systems

The venturi/pneumatic flow measuring systems were recalibrated in the Spring of 1987. There is some question as to the accuracy of the system since, for example, the sum of the individual filter flows does not correspond to the raw water flow. This discrepancy could be in part attributed to the inherent inaccuracies of a pneumatic system in which signals pass through a number of instruments, each having its own degree of accuracy. In addition, the flows are at the low end of the range of some of the instruments and because the accuracy of some instruments is based on the full scale value, low flows are less accurate.

The primary and secondary flow elements should be calibrated, refurbished if necessary and documented on a regular basis.

SECTION C
PROCESS COMPONENTS

C.1 General

The plant components include the intake, coarse and fine raw water screens, low lift pumps, solids contact upflow clarifier, dual media filters, underground storage and high lift pumps (Figure 2). The plant has chemical facilities for coagulation, disinfection, fluoridation and taste and odour control. Refer to Figures 3, 4 and 5 in Appendix A for Site Plan, Block Schematic and Process and Piping Diagram.

Treatment flow rates are selected manually and the high lift pumps operate automatically based on water levels in the elevated water storage tank.

C.2 Design Data

a) Plant Capacity

The plant, constructed in 1972, has a design capacity of 18.2 ML/d (4 mgd). There have not been any projects undertaken since that time to increase plant capacity. Growth in the service area envisaged at the time the plant was designed has not materialized and the plant operates at less than 50% of capacity most of the time. Average daily flows are 5.8 ML/d (1.3 mgd) during the winter and 7.7 ML/d (1.7 mgd) during the summer. Minimum, maximum and average daily flows during the study period were 4.3, 12.1 and 6.51 ML/d (0.95, 2.7 and 1.4 mgd) respectively.

C.3 Process Component Inventory

a) Intake

The 900 mm (36 in) diameter reinforced concrete intake pipe is approximately 155 m (510 ft) long and extends to a point approximately 60 m (200 ft) from shore in the Detroit River. The intake crib has a steel

AMHERSTBURG AREA WATER TREATMENT PLANT

(1987)

BLOCK DIAGRAM

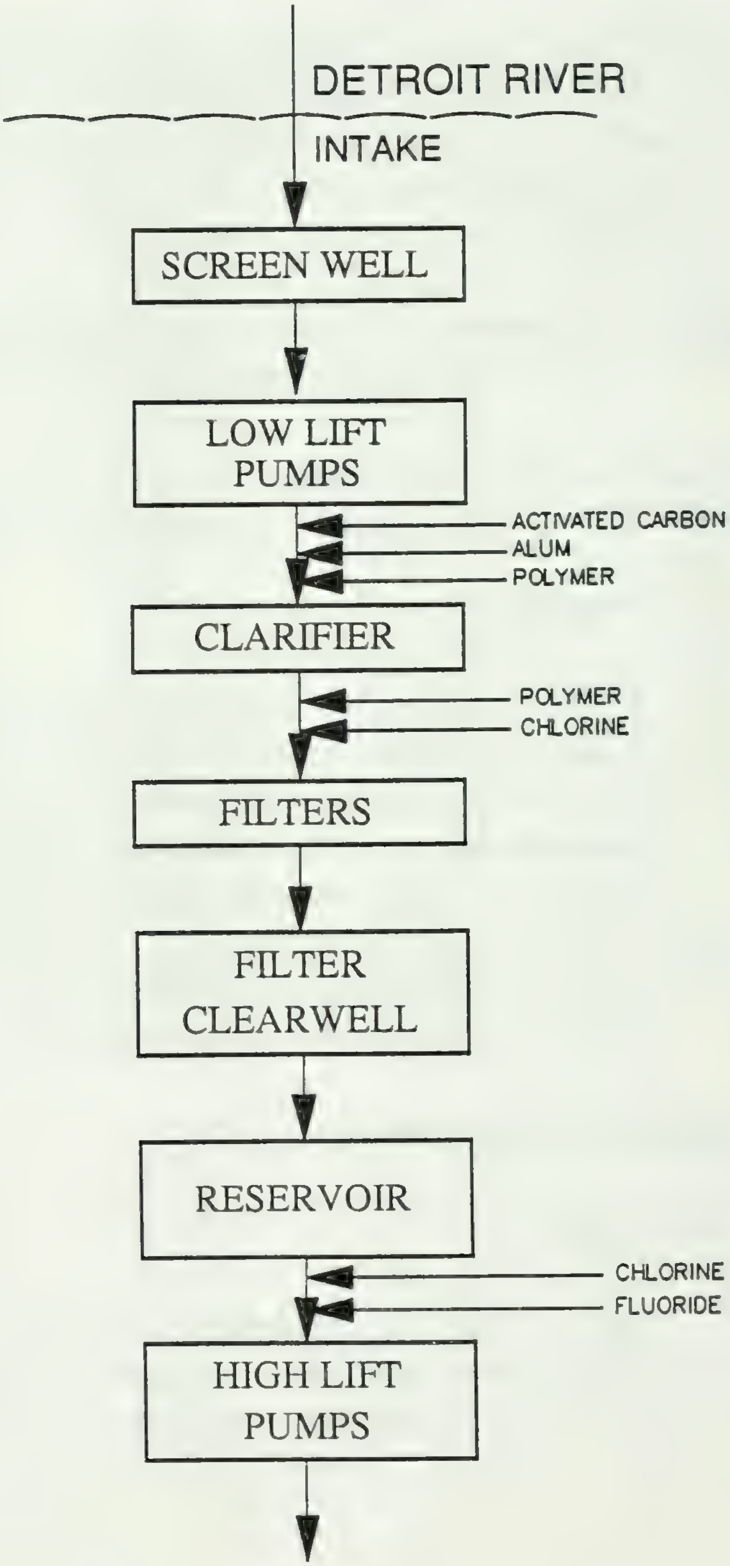


Figure Nº 2

exterior 6.1 m (20 ft) deep x 3.5 m (11.5 ft) wide x 2.67 m (8.75 ft) high, with an interior steel transition section 6.1 m (20 ft) wide x 1.5 m (5 ft) high at the inlet reducing to 1.5 m (5 ft) wide x 1 m (3.3 ft) high where it connects to the end of intake pipe. The space between the outer steel surface and the transition section is filled with concrete. Raw water enters the crib through a 6.1 m (20 ft) wide x 1.5 m (5 ft) high opening having 12 mm (0.5 in) thick vertical bars spaced at 300 mm (12 in). The inlet opening is vertical and is parallel to the shoreline. The center of the inlet is 1.16 m (3.8 ft) above the river bottom, and 5.5 m (18 ft) below mean river level.

The capacity of the intake is 218 ML/d (48 mgd) at mean river surface elevation of 174.35 m (573.8 ft) and low water level in the low lift pump well of 171.95 m (564.2 ft).

b) Screening

The low lift pump well entry chamber has a coarse bar screen 2.44 m (8 ft) wide with vertical bars forming 90 mm (3.5 in) wide openings. Following coarse screening, the raw water passes through a Link-Belt travelling water screen 1.83 m (6 ft) wide with 9.5 mm (0.375 in) mesh. The entry chamber is 2.44 m x 3.5 m x 7.9 m (8 ft x 11.5 ft x 26 ft) water depth having a volume of 41 m^3 (9,000 gal).

Screenings from the travelling screens drain to the plant storm sewer system which discharges at the shore of the Detroit River.

c) Low Lift Pumping

The low lift chamber is 9.45 m x 9.14 m x 6.60 m (31 ft x 30 ft x 21.67 ft) deep. The storage volume is approximately 380 m^3 (83,500 gal). The low lift pumping system is comprised of 3 Johnston vertical turbine pumps driven by electric motors and having the following performance characteristics:

LL-1: 9.27 ML/d (2 mgd) at 21.3 m (70 ft) TDH with 37.3 kW (50 HP) motor
LL-2: 9.27 ML/d (2 mgd) at 21.3 m (70 ft) TDH with 37.3 kW (50 HP) motor

LL-3: 22.9 ML/d (5 mgd) at 21.3 m (70 ft) TDH with 74.6 kW (100 HP) motor

Firm pumping capacity with the largest pump out of service is 18.5 ML/d (4 mgd).

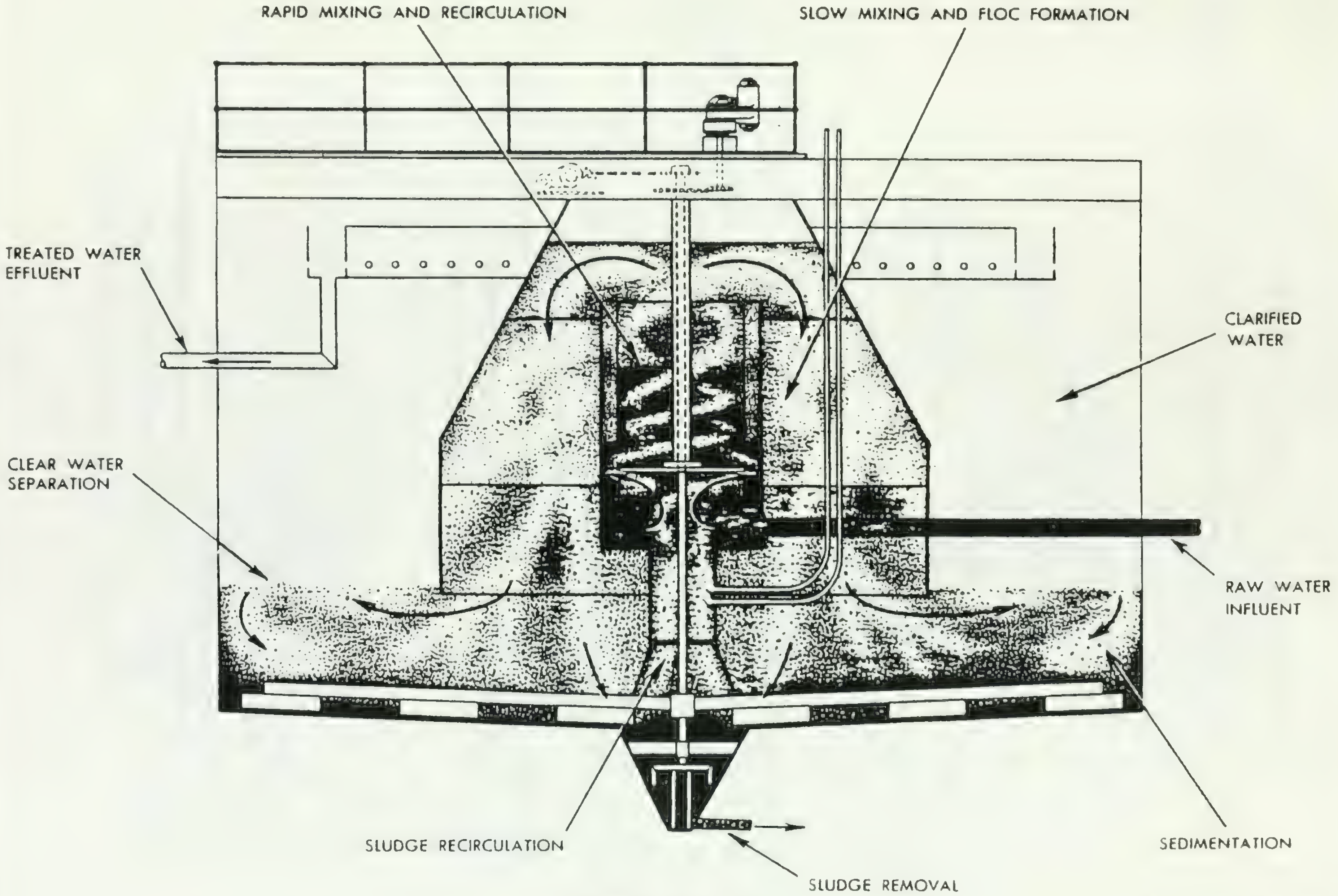
The pumps discharge into a common header and the raw water flows through approximately 63 m (205 ft) of 600 mm (24 in) diameter and 8 m (26 ft) of 300 mm (12 in) pipe to the clarifier.

d) e) f) Flash Mixing, Flocculation, Settling

Flash mixing, flocculation and settling occur in a Graver solids contact upflow clarifier 19.82 m (65 ft) diameter by 4.9 m (16 ft) side water depth (Figure 6). The clarifier is outdoors and has submerged collection pipes to allow for winter operation. Water level in the clarifier is controlled by a weir on the outlet of the central clarified water collection launder. Bottom scrapers move settled sludge to a central hopper from which it is discharged through the plant storm sewer system to the Detroit River.

The clarifier has a rating of 18.2 ML/d (4 mgd) and has overflow rates of 2.46 m/h (0.84 gpm/sq ft) based on the total tank surface area, and 2.92 m/h (1.0 gpm/sq ft) based on the area of the surface of the settling zone. The total volume of the clarifier is 1,720 m^3 (378,500 gal) which gives a retention time of 136 minutes at 18.2 ML/d (4 mgd).

Clarifier effluent flows though 24 m (80 ft) of 900 mm (36 in) diameter pipe to the filter influent channel.



SKETCH OF
TYPICAL CLARIFIER

Figure N°6

g) Filters

The plant has four dual media filters having the following characteristics:

Number of filters: 4
Dimensions: 7.93 m x 4.88 m (26 ft x 16 ft)
Distance from top of filter box to:
  Water level: 0.45 m (1.5 ft)
  Top of W.W. trough: 1.98 m (6.5 ft)
  Top of anthracite: 3.25 m (10.67 ft)
  Top of sand: 3.71 m (12.18 ft)
  Top of gravel: 4.01 m (13.16 ft)
  Top of underdrain: 4.39 m (14.4 ft)
  Bottom of underdrain: 4.72 m (15.5 ft)

Depth of water over media: 2.8 m (9.2 ft)
Capacity: 4.55 ML/d @ 4.9 m/h (1 mgd @ 1.67 gpm/sq ft) (design)
  11 ML/d @ 12 m/h (2.42 mgd @ 4 gpm/sq ft)(MOE guideline)
Hydraulic Capacity: 22 ML/d (4.84 mgd)
Underdrains: Miller Block
Surface Washers: 2 - 3.81 m (12.5 ft) dia. per filter
Graded Gravel: 380 mm (15 in) total depth
  76 mm (3 in) - 50 mm x 25 mm
  76 mm (3 in) - 25 mm x 12.5 mm
  76 mm (3 in) - 12.5 mm x 4.7 mm
  76 mm (3 in) - 4.7 mm x 2.4 mm
  76 mm (3 in) - 2.4 mm x 1.2 mm
Silica Sand: 300 mm (12 in) depth, E.S.= 0.56 mm, U.C.= 1.59
Anthracite: 460 mm (18 in) depth, E.S.= 0.86 mm, U.C.= 1.75
Influent turbidity (FTU): 8.6 Avg. (1984-1986)
Effluent turbidity (FTU): 0.23 Avg.(1984-1986)
Average length of run: 72 hr.
Headloss: 0.30 m (1 ft) clean bed
  2.13 m (7 ft) dirty bed
Filter Flow Rate: 3.52 to 5.86 m/h (0.77 to 1.3 gpm/sq ft)

Backwash Flow Rate: Mainwash 38 m/h (13 gpm/sq ft)
Water Filtered/cycle: 200 m^3/m^2 (4,090 gal/sq ft) (average)
Backwash Water Use: 14 m^3/m^2/wash (286 gal/sq ft/wash) (average)
Retention time: 18 min @ 12 m/h (4 gpm/sq ft) (MOE Guideline)
37 min @ 5.86 m/h (1.3 gpm/sq ft) (actual min. DT)
44 min @ 4.9 m/h (1.67 gpm/sq ft) (design)
61 min @ 3.52 m/h (0.77 gpm/sq ft) (actual max. DT)
Backwash Water Pump: Johnston Vertical Turbine
35.5 ML/d (7.8 mgd) @ 14.9 m (49 ft) with 74.6 kW (100 HP) electric motor
Alternate Backwash Water Supply: Through 400 mm (16 in) dia. piping from high lift pump discharge. The pressure is controlled by a self-regulating valve.

To make up for anthracite lost during backwashing, 3.5 m^3 (124 cu ft) of anthracite (E.S. 0.85 - 0.95, U.C. 1.5 or less) was added to each filter in 1987. Filter inspection, disinfection and topping up is done on a three year basis.

Clarifier effluent flows into each filter through ports in a channel running the length of the filter. Filter effluent piping is 300 mm (12 in) diameter and has a venturi type primary flow element for flow measurement. A Johnston vertical turbine pump located in the high lift pump well provides backwash water through 400 mm (16 in) diameter piping to the filters. The piping has a 400 mm (16 in) diameter venturi type primary flow element for flow measurement.

Water for the filter surface agitators (jet wash) is provided through a 150 mm (6 in) diameter pipe connected to the plant discharge main. A 150 mm (6 in) diameter venturi type primary flow element is provided for flow measurement. Filter backwashing is done from filter control consoles located in the filter gallery. Valve positions, washwater and jet wash flow rates are manually selected by the operator at the console. Main wash and jet wash flows are recorded and totalized on instruments in the main control panel.

h) Storage and High Lift Pumping

i) Filter Clearwell

Filter effluent discharges to the filter clearwell located under the filters. The filter clearwell is 29.73 m x 13.06 m x 3.66 m (97.5 ft x 42.83 ft x 12 ft) maximum water depth, and has a storage volume of 1,421 m^3 (312,600 gal).

ii) Underground Reservoir

Water flows from the filter clearwell into an underground reinforced concrete storage reservoir 90.55 m x 44.94 m x 3.96 m (297 ft x 147.5 ft x 13 ft) deep. At the maximum water depth of 3.66 metres (12 ft), the storage volume is 14,900 m^3 (3.3 mil gal).

Reservoir effluent flows to the high lift pump well which is comprised of two compartments. Compartment No. 1 is 1.43 m x 3.10 m x 5.11 m (4.67 ft x 10.18 ft x 16.75 ft) deep. Compartment No. 2 is 6.55 m x 3.10 m x 5.11 m (21.5 ft x 10.18 ft x 16.75 ft) deep.

At the maximum water depth of 4.88 m (16 ft) the storage volume in the two compartments is 273 m^3 (60,000 gal).

iii) High Lift Pumps

The high lift pumping system consists of three Johnston vertical turbine pumps as follows:

HL-1: 11.5 ML/d (2.5 mgd) at 52 m (170 ft) - 37.3 kW (50 HP) electric motor
HL-2: 11.5 ML/d (2.5 mgd) at 52 m (170 ft) - 37.3 kW (50 HP) electric motor

HL-3: 22.9 ML/d (5 mgd) at 58 m (190 ft) - 74.6 kW (100 HP) electric motor

Firm capacity with largest pump out of service = 21 ML/d (4.62 mgd)

i) Backwash Treatment and Sludge Disposal

Filter backwash waste water and clarifier sludge drain to the plant storm sewer system which discharges without treatment to the Detroit River.

C.4 Chemical Systems

a) Disinfection

Chlorine is used as a disinfectant. The chlorination system utilizes 0.9 tonne (2,000 lb) containers of liquid chlorine and gas chlorinators. Six chlorine containers are on hand at all times, two on a scale and four in storage. Chlorine is withdrawn from only one of the containers on the scale and when it is empty the other container is placed in service and the empty one replaced with a full container from storage. When the four containers in storage are empty a new shipment of four containers is ordered. The pre, post and standby chlorinators have pneumatic positioners originally installed for flow paced chlorine feed. At the present time chlorine dosages and feed rates are adjusted manually.

i) Pre-Chlorination

Pre-chlorination chlorine solution is added in the filter influent channel. The pre-chlorinator is a Wallace and Tiernan Series V800, 0.9 tonne per day (2,000 lb/d) gas chlorinator, having a 0-68 kg/d (0-150 lb/d) rotameter. The rotameter will allow a maximum dosage of 3.7 mg/L at 18.2 ML/d (4 mgd).

Prior to 1978, chlorine solution for pre-chlorination was added through a diffuser to the low lift pump well. The application point was changed to reduce the formation of trihalomethanes.

ii) Post-Chlorination

Post-chlorination chlorine solution is added through a diffuser to the inflow to the high lift pump well. The post-chlorinator is a Wallace and Tiernan Series V800, 0.9 tonne per day (2,000 lb/d) gas chlorinator with 0-23 kg/d (0-50 lb/d) rotameter. The rotameter will allow a maximum dosage of 3.7 mg/L at 18.2 ML/d (4 mgd).

iii) Stand-by Chlorinator

The stand-by chlorinator can be used for either pre or post-chlorination and is a Wallace and Tiernan Series V-800 0.9 tonne per day (2,000 lb/d) gas chlorinator with a 0-227 kg/d (0-500 lb/d) rotameter. The rotameter will allow a dosage of 12.4 mg/L at 18.2 ML/d (4 mgd). This chlorinator is dedicated for stand-by use only.

iv) Spare Chlorinator

The plant was originally provided with a chlorine dioxide system which is not now used. The Wallace and Tiernan 182 kg/d (400 lb/d) chlorinator provided for the chlorine dioxide system is available for emergency use. It has a 0-68 kg/d (0-150 lb/d) rotameter which will provide a maximum dosage of 2.45 mg/L at 18.2 ML/d (4 mgd).

b) Coagulant

Liquid alum is used as a coagulant and is injected into the low lift pump discharge header just downstream from the pumps. The alum storage and feed system is comprised of the following:

Two-20 m^3 (4,400 gal) fibreglass storage tanks located inside the water treatment plant building.

Two-Wallace and Tiernan Model A-747 dual-head diaphram metering pumps having a maximum delivery of 1.32 L/min/head (17.4 gal/h/head). Manual dosage and feed rate adjustment are practised.

The maximum possible dosage of alum with all pumping heads in operation is 270 mg/L at a plant flow rate of 18.2 ML/d (4 mgd).

c) Fluoride

Fluoride is added through a diffuser to the high lift pump well inlet. The fluoride storage and feed system is comprised of the following:

One 6.82 m^3 (1,500 gal) rubber lined steel hydrofluosilicic acid storage tank.

One 0.20 m^3 (45 gal) polyethylene day tank.

Wallace and Tiernan Model A-747 diaphragm metering pump having a maximum capacity of 1.32 L/min.

Day tank weigh scale with loss of weight recorder.

Solution is mixed in the day tank in a ratio of 45.45 kg (100 lb) hydrofluosilicic acid (19.8% available F) and 99.45 kg (220 lb) water. The resultant solution has a concentration of 6.2% available F. At a maximum feed rate of 1.32 L/min the maximum dosage is 6.5 mg/L at 18.2 ML/d (4 mgd).

d) Other Chemical Systems

i) Coagulant Aid

Alchem 86070 non-ionic polymer is used as a coagulant aid. Polymer is mixed with water to give a polymer concentration of 0.11% and stored in a 2.27 m^3 (500 gal) fibreglass tank. The polymer is fed to the mixing zone of the clarifier by a single head Wallace and Tiernan Series A-747 diaphragm metering pump, maximum capacity 1.32 L/min (17.4 gal/h).

ii) Filter Aid

Alchem 8184 polymer is used as a filter aid. Polymer is mixed with water to give a polymer concentration of 0.11% and stored in a 0.20 m^3 (45 gal) day tank. Filter aid is fed to the filter influent channel by a single head Wallace and Tiernan Series A-747 diaphragm metering pump, maximum capacity of 1.32 L/min (17.4 gal/h).

iii) Taste and Odour Control

Powdered activated carbon is used for taste and odour control and is added in the centre core of the clarifier.

The carbon system consists of a bag unloading station, bucket elevator, storage hopper, screw feeder, mixing tank, mixer and feed pump.

The system is capable of storing approximately 0.7 m^3 (25 cu ft) of carbon and the screw feed can feed carbon to the mixing tank at a maximum rate of 0.08 m^3/h (2.8 cu ft/h).

The slurry feed pump is a Moyno progressing cavity pump with an 11.25 L/min (2.5 gal/min) capacity.

The maximum dosage rate is 84 mg/L at a raw water flow of 18.2 ML/d (4 mgd).

C.5 Sampling

Samples of raw water, clarifier effluent, filter effluent and plant effluent are obtained from continuous streams to display jars located in the control room. Details of the sampling systems are given in Table 10 and 11.

C.6 Process Automation

The original plant construction included pneumatic/electric control systems for automatic operation as follows:

Travelling Screen: Automatic washing initiated by preset water level differential across the screen.

Raw Water Flow: Automatic regulation of the butterfly valve in the low lift pump discharge header to maintain a preset water level in the filters.

Filter Flow: Automatic regulation of filter flow in inverse proportion to the water level in the reservoir.

Clarifier Sludge Blowdown: Automatic blowdown based on flow volume.

Chemical Feed: Automatic regulation of chemical feed rate in proportion to flow with manual adjustment of dosage.

Plant Discharge: Automatic operation of High Lift Pumps from elevated water storage tank level.

Miscellaneous: Push button operation of motors and valves from central control panel.

TABLE 10

SAMPLING SYSTEMS

AMHERSTBURG AREA WATER TREATMENT PLANT

SAMPLES	LOCATION	DIA (mm)	LENGTH (m)	SAMPLE PIPING VERTICAL RISE (m)	MATERIAL	FLOW RATE (L/min)	VELOCITY (m/s)	TRAVEL TIME (sec)
Raw Water	Pumped from low lift well	7.9	38	12	Copper	2.25	0.77	49
Clarifier Effluent	Pumped from filter influent channel	7.9	42	6.7	Copper	2.25	0.77	55
Filter Effluent	Pumped from filter clearwell at outlet to reservoir	7.9	57	6.7	Copper	2.25	0.77	74
Plant Effluent	High lift pump discharge header	7.9	18	9.4	Copper	2.25	0.77	23

At the present time, the automatic systems for only raw water flow and plant discharge are used.

C.7 Standby

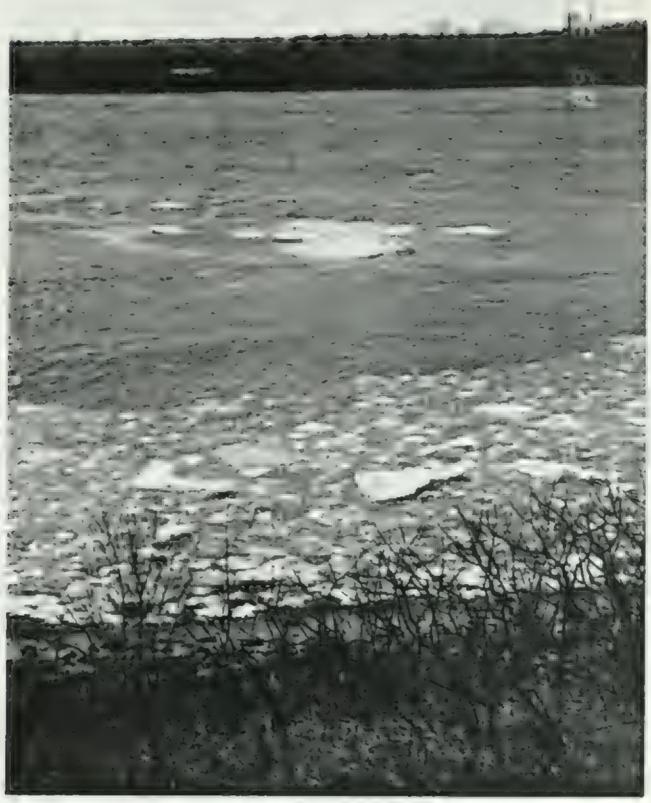
The plant has a 400 kW diesel engine generator which is capable of supplying sufficient power to operate all plant facilities except electric heating. The system was originally provided with a system to automatically start the engine on power failure and transfer power, but at the present time, this is done manually.

C.8 Photographs

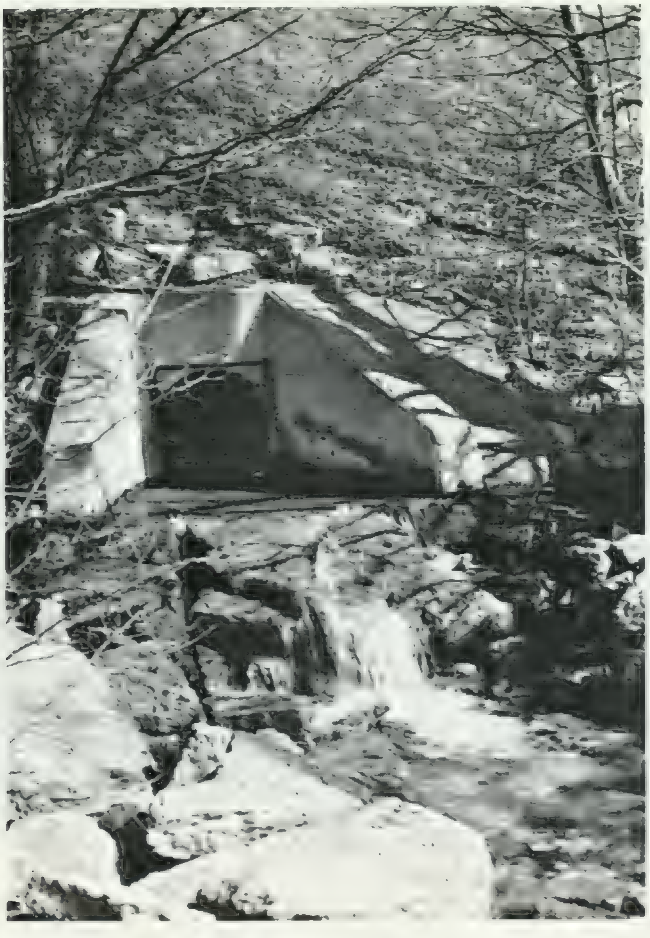
Following are photographs illustrating the plant and its equipment.

1. Plant Building Sign

2. View of West Side of Plant



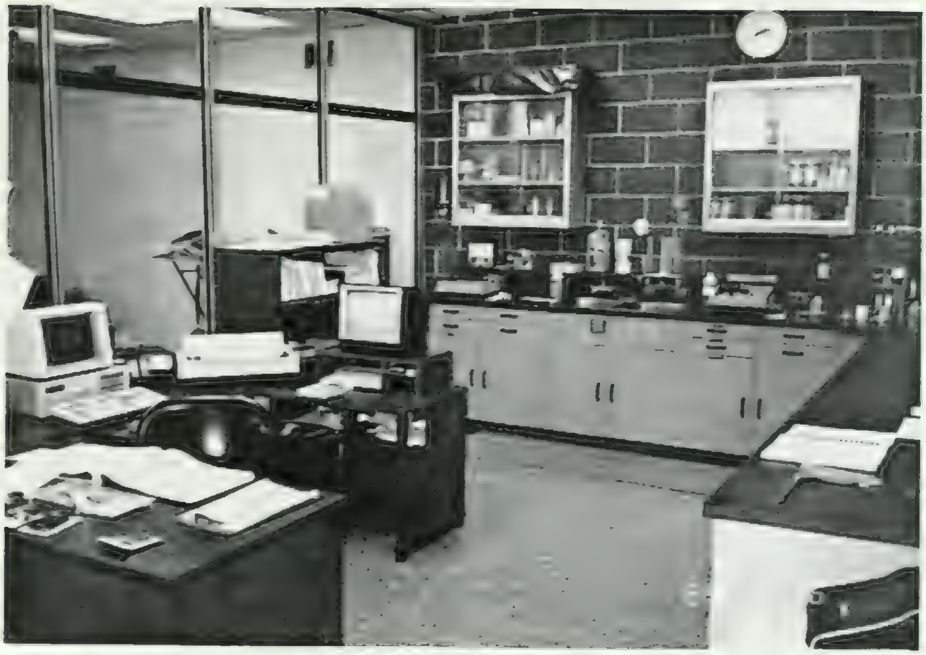
3. Detroit River at Intake Location



4. Plant Drain Outlet at Shore of Detroit River

5. Security T.V. Camera at Entrance

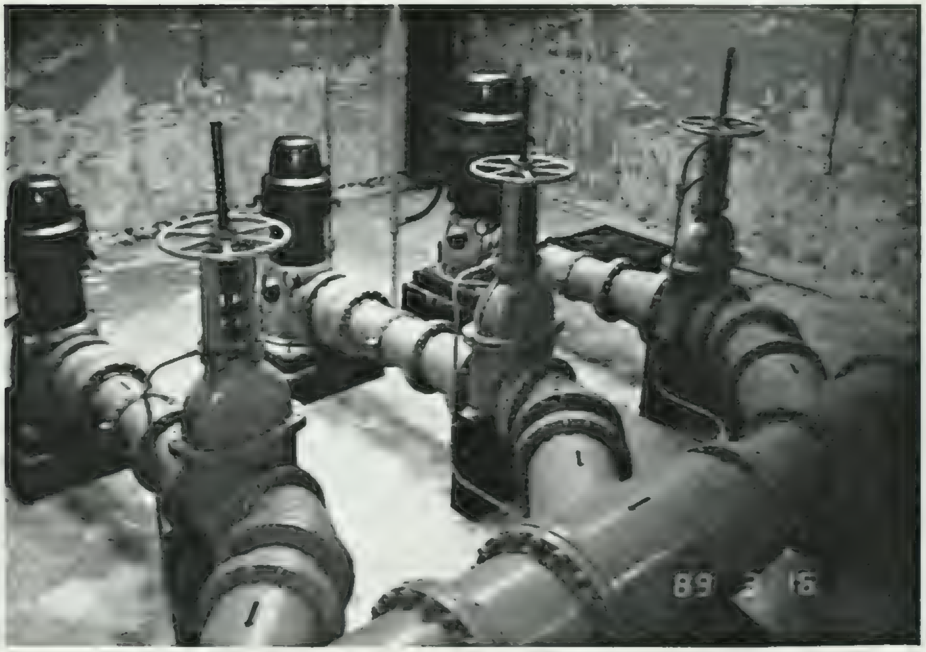
6. Display Jars



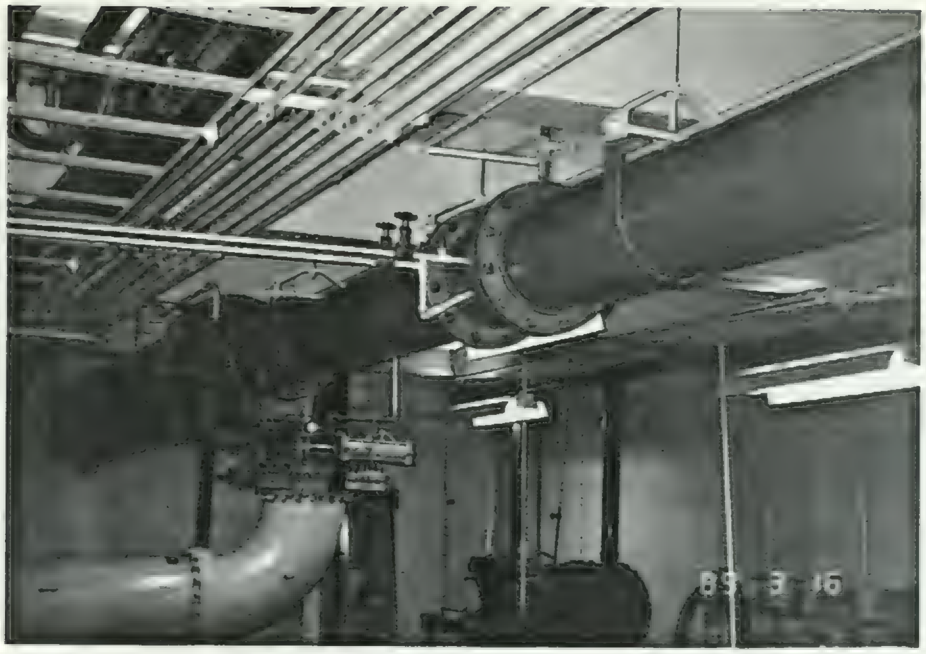
7. Laboratory and Office Area

8. Control Panel

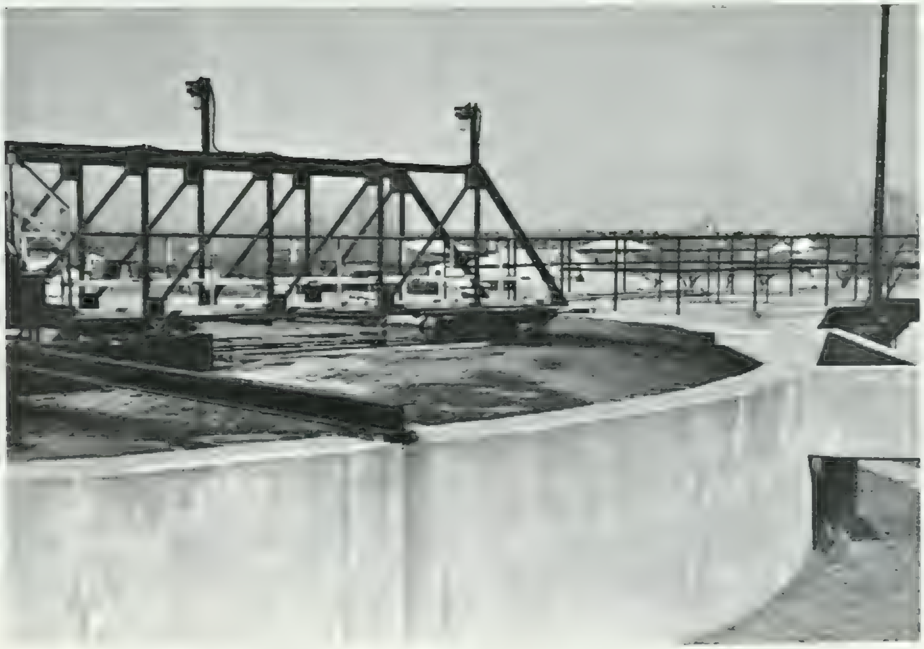
9. Travelling Water Screen



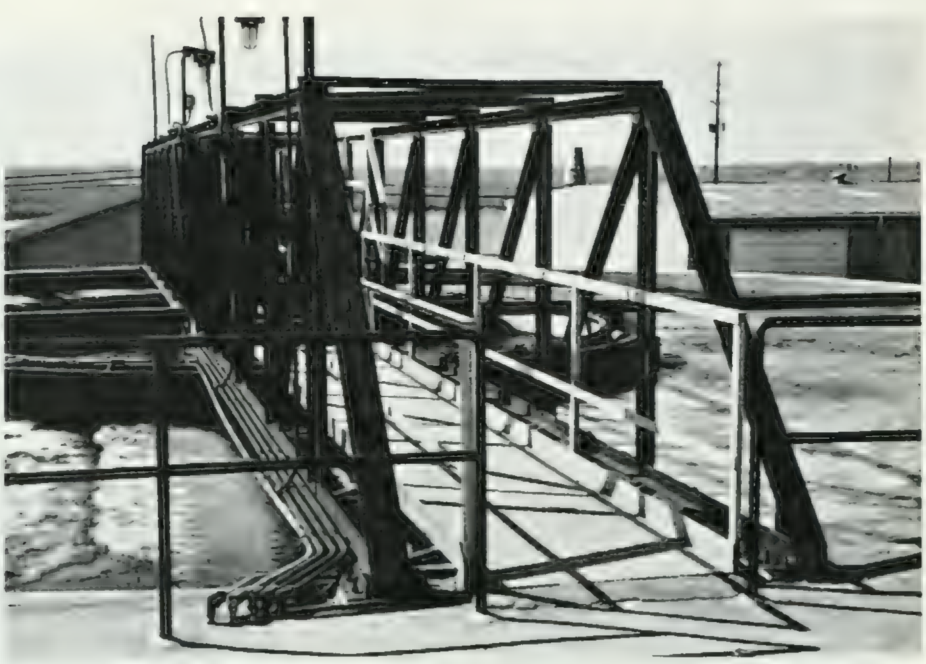
10. Low Lift Pumps and Discharge Piping



11. Low Lift Pump Discharge Flow Meter

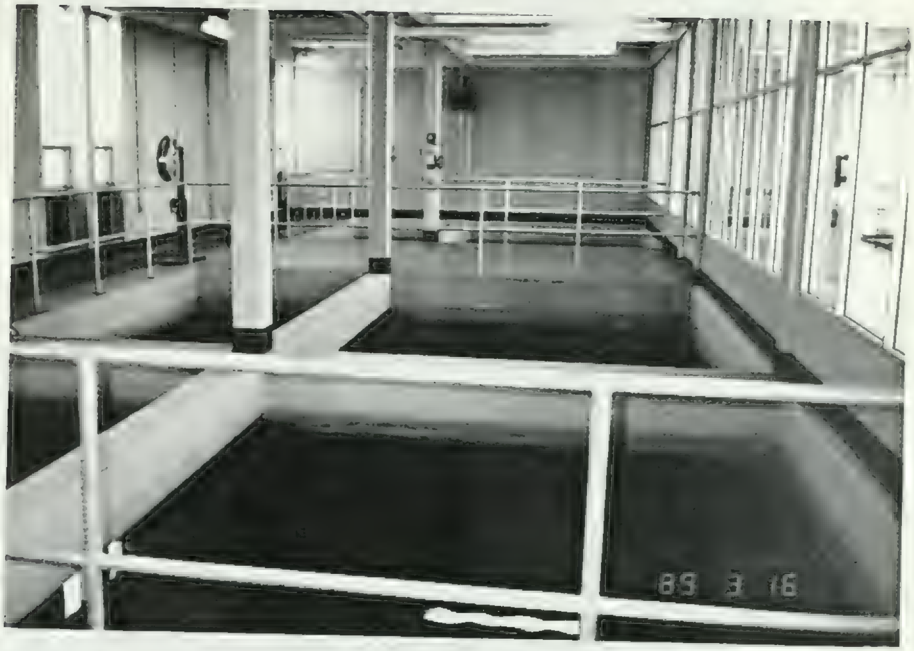


12. Clarifier

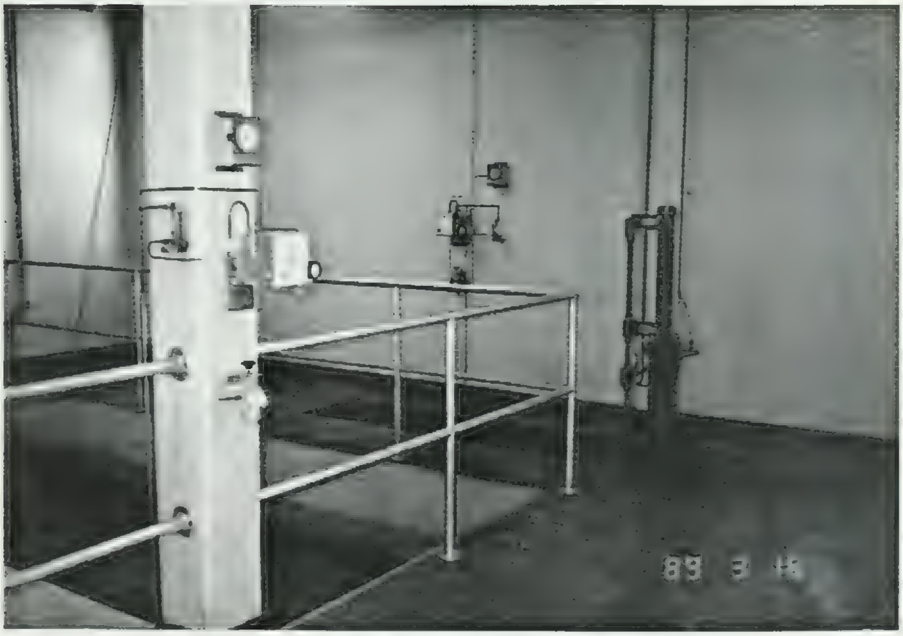


13. Clarifier Bridge

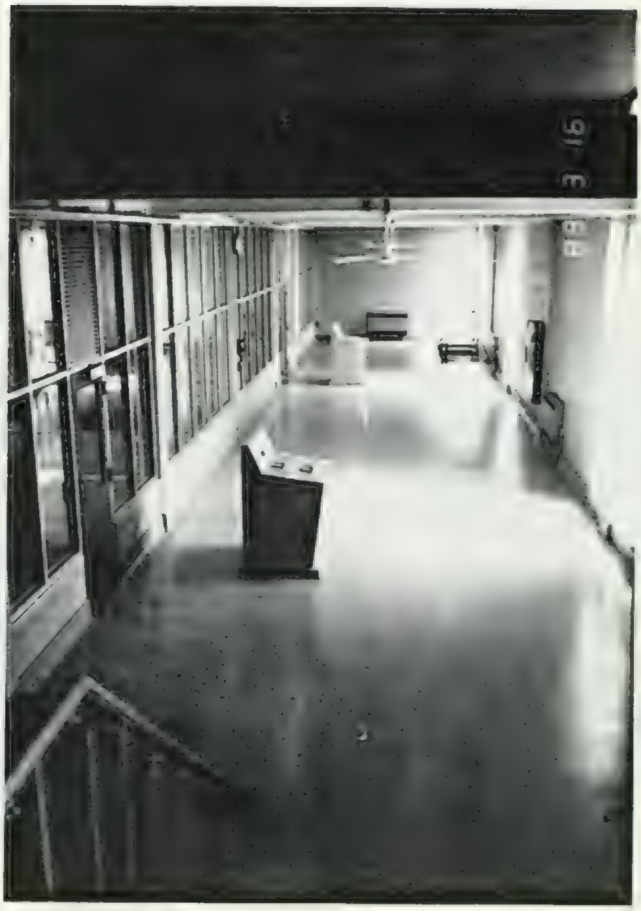
14. Clarifier. Discharge from Submerged Collector. Note Heat Lamp to Prevent Ice Formation.



15. Filters

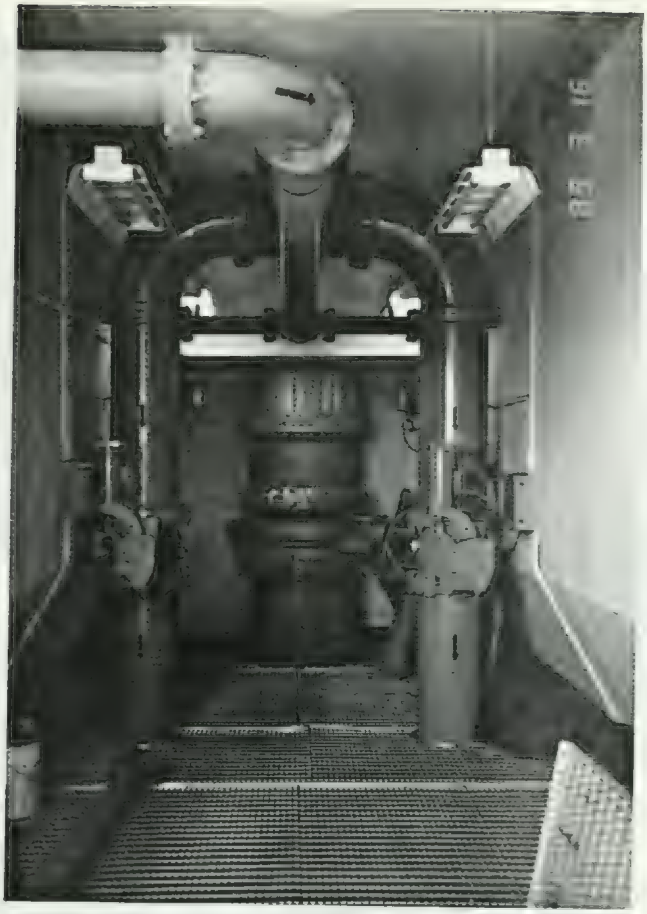


16. Filter Inlet Valve Operator and Water Level Measuring Instruments

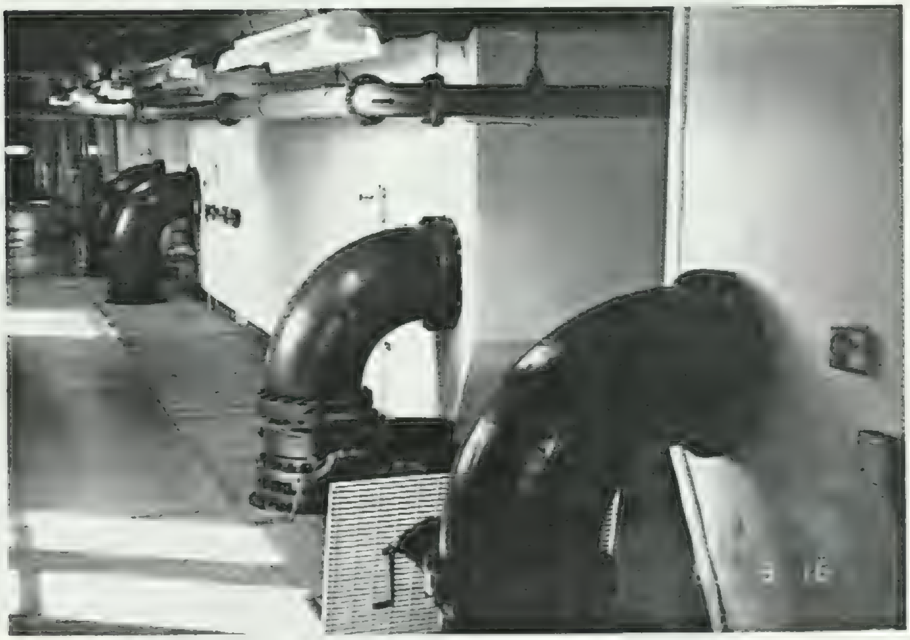


17. Filter Operating Gallery

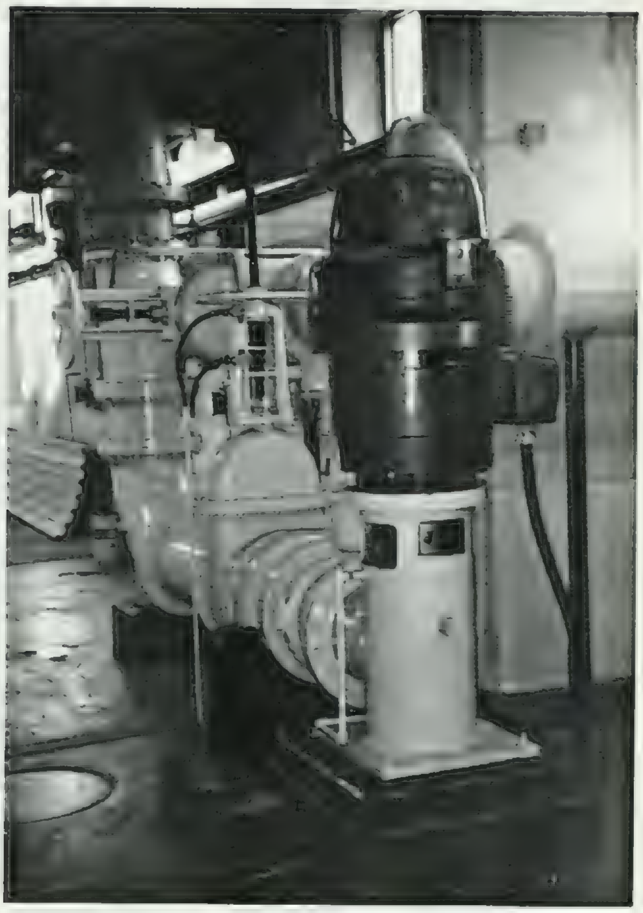
18. Filter Backwash Console



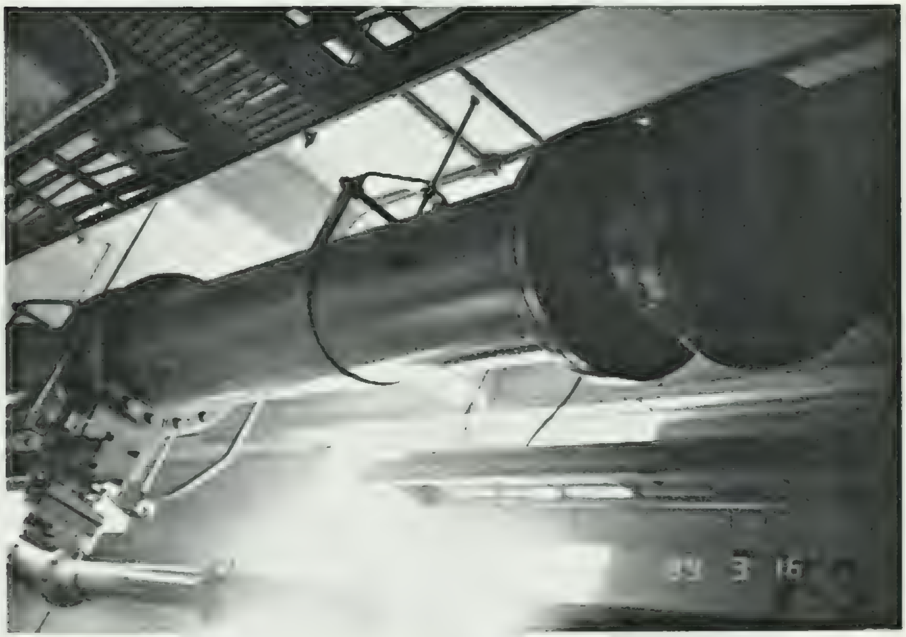
19. Filter Piping



20. Filter Backwash Drain Piping



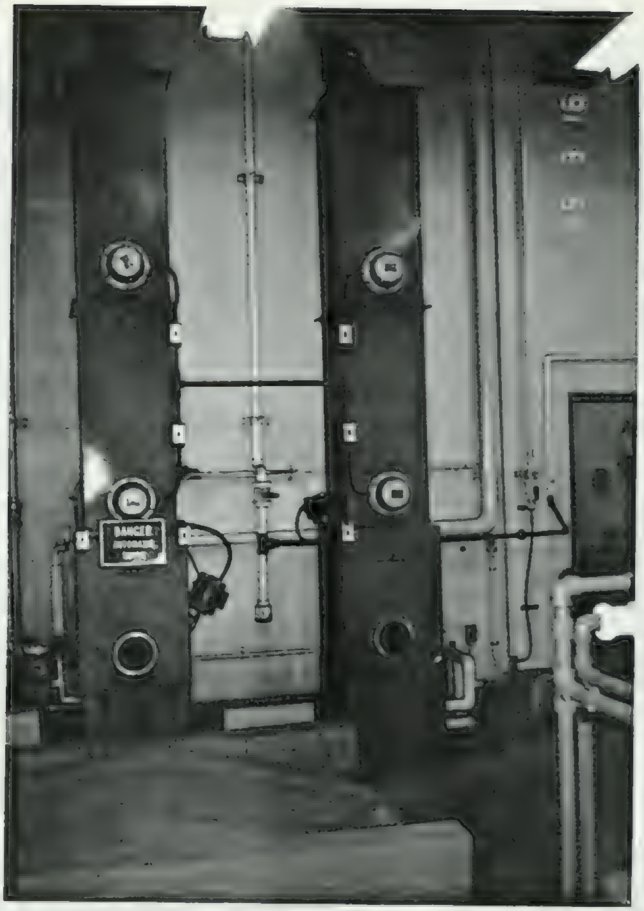
21. Filter Backwash Pump



22. Filter Backwash Pump Discharge, Flow Meter and Control Valve

23. Hydrofluosilicic Acid Storage Tank

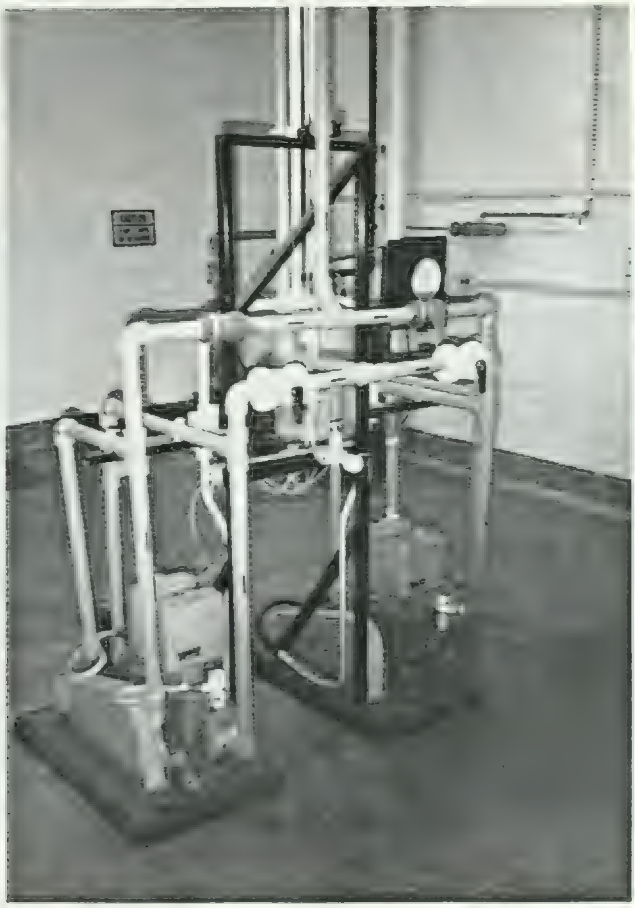
24. Hydrofluosilicic Acid Day Tank,
Scale and Metering Pump



25. Activated Carbon Storage Hoppers and Feeders

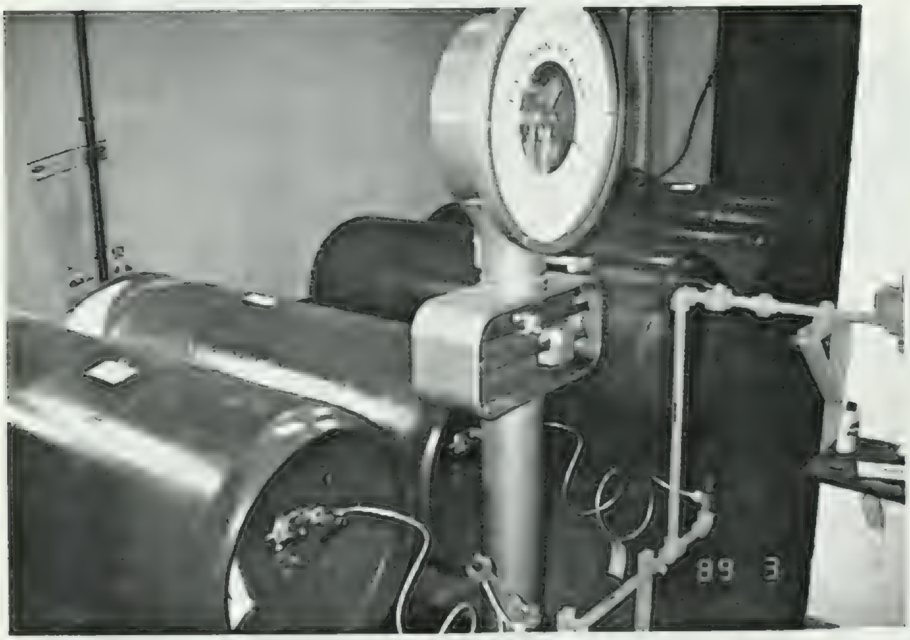
26. Activated Carbon Bucket Elevator, Loading Hopper and Filter Aid Storage and Mixing Tank

27. Coagulant Aid Mixing and Storage Tank and Feed Pump

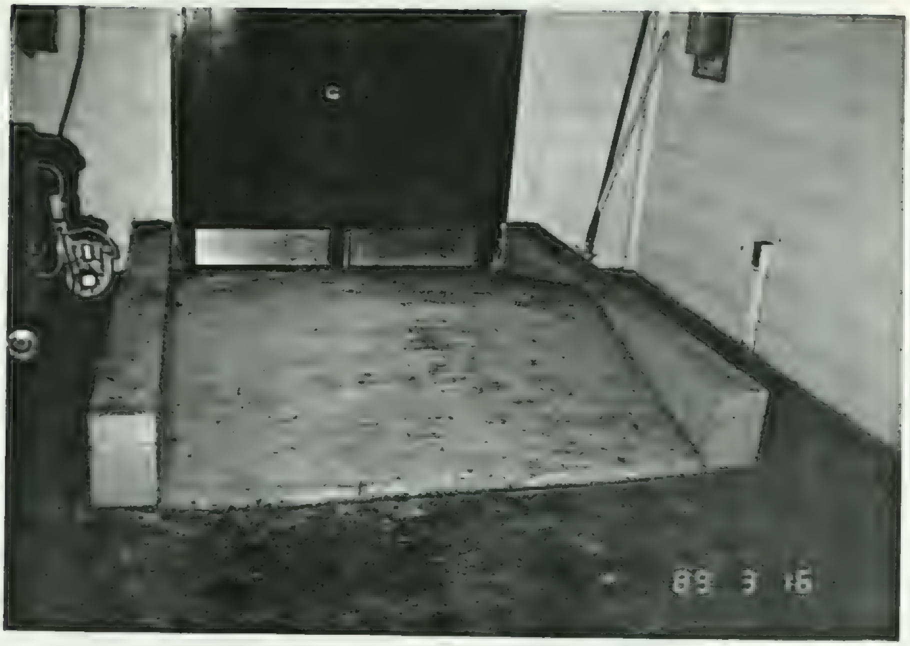


28. Liquid Alum Feed Pumps

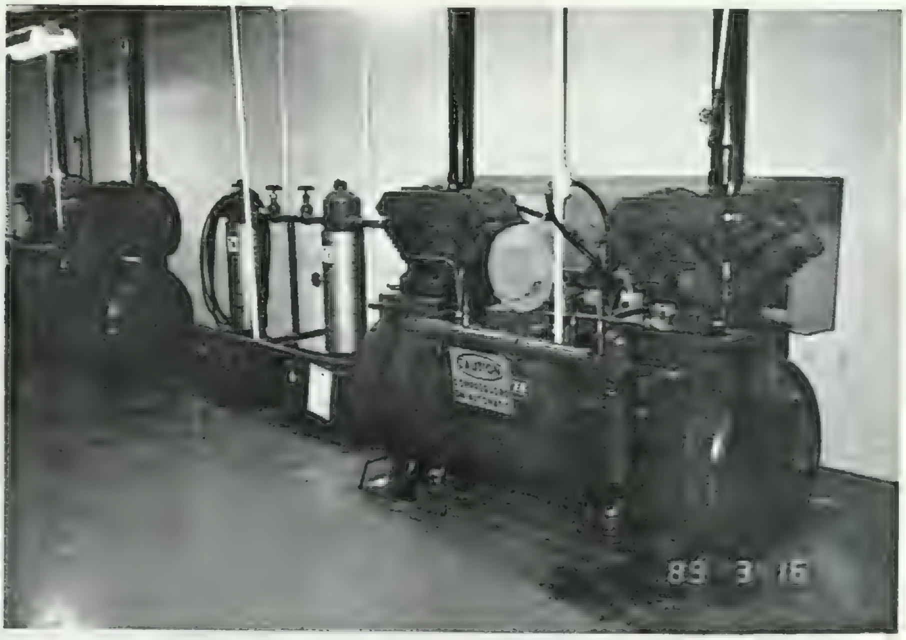
29. Chlorinators



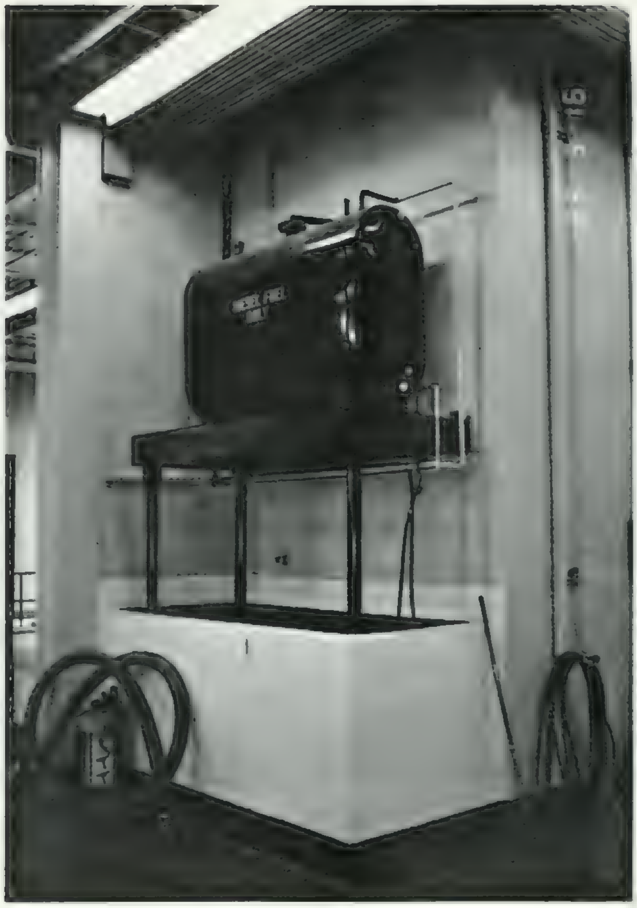
30. Chlorine Container Scale and Storage



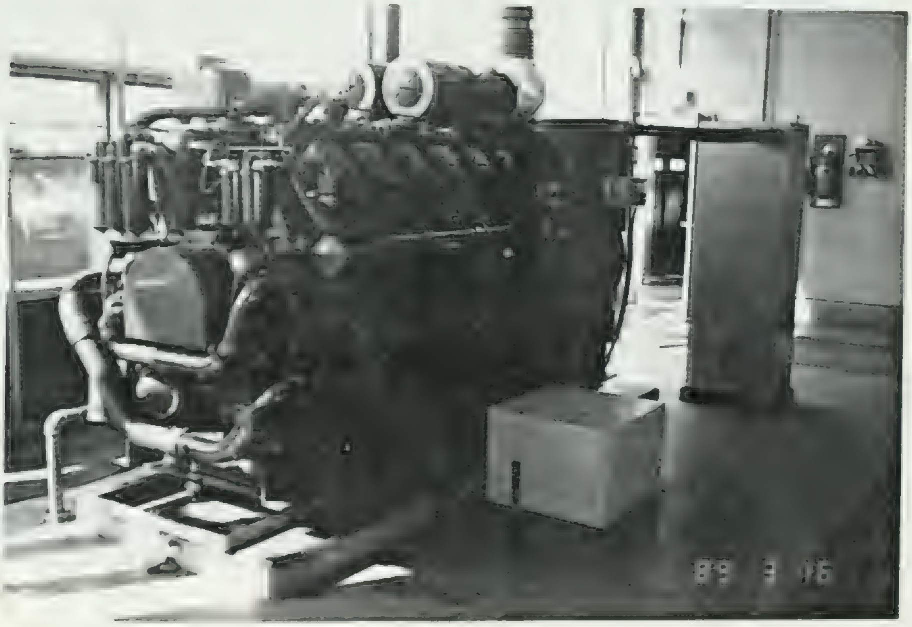
31. Containment Ramp at Chemical Room Access Door.



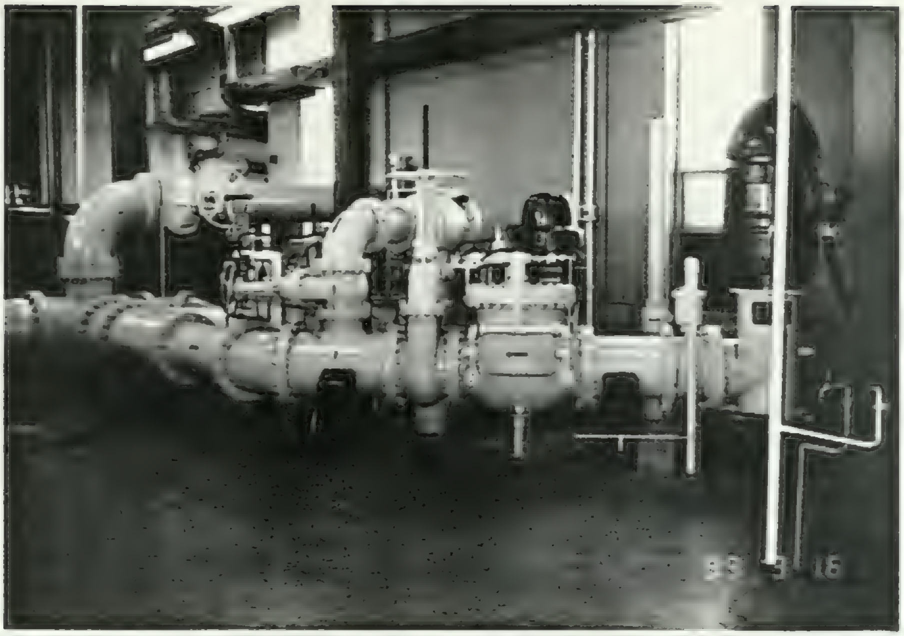
32. Instrument Air Compressors and Dryers



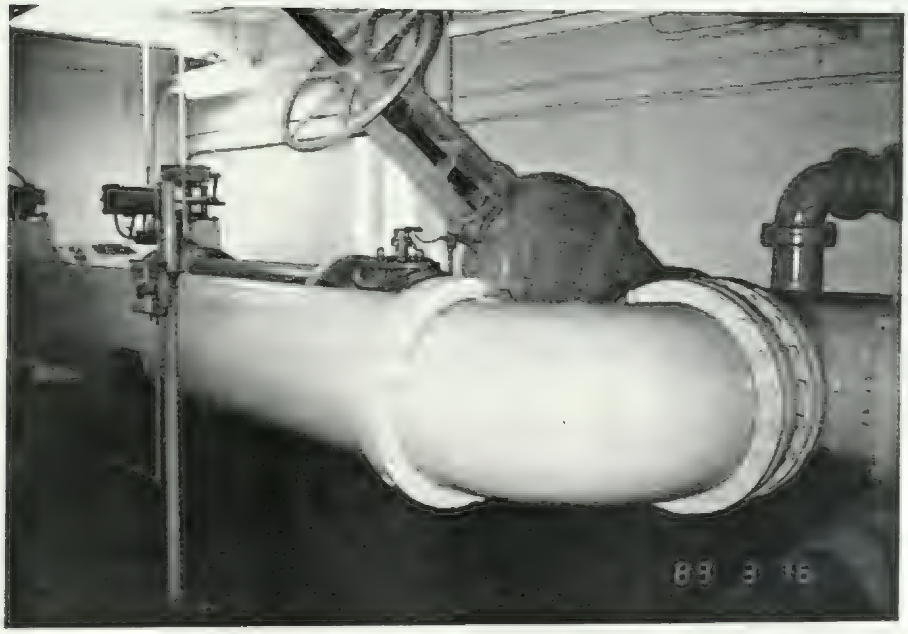
33. Diesel Engine Generator Fuel Storage Tank with Spill Containment Area Below.



34. Diesel Engine Generator



35. High Lift Pumps and Discharge Piping



36. Plant Output Meter and By-Pass.

SECTION D
PLANT OPERATION

D.1 General Description

The 18.2 ML/d (4 mgd) Amherstburg Area Water Treatment Plant was constructed in 1971. It is a custom built plant having conventional (ie. clarification/filtration) treatment and operates on a continuous basis.

To meet the water demand of the distribution systems, the plant is required to operate at less than 50% of its rated capacity the majority of the time (Figure 7).

The Water Treatment Plant Staff consists of a superintendent, five operators, one electrician, a mechanic and a groundskeeper/caretaker. The plant is manned 24 hours per day (3 shifts) seven days a week. On the day shift, the superintendent, electrician, mechanic, and two operators are on duty. One operator is on duty on afternoon and midnight shifts, on weekends and holidays.

In addition to operation and maintenance of the water treatment plant, the staff has responsibility for the sewage works systems in the Townships of Sandwich West and Anderdon (Edgewater Beach), and the provincial waterworks systems in the Townships of Malden and Anderdon. Approximately one half of the superintendent's, mechanic's, electrician's and one of the operator's time is spent on these projects.

Although the plant has facilities for automatic operation, it is mainly operated manually. The plant superintendent prefers manual operation in light of the high finished water quality requirements and the age and reliability of the automatic controls. Manual operation also avoids staff complacency which can sometimes occur with automated systems. Manual operation requires operators to become more involved in understanding the processes and equipment.

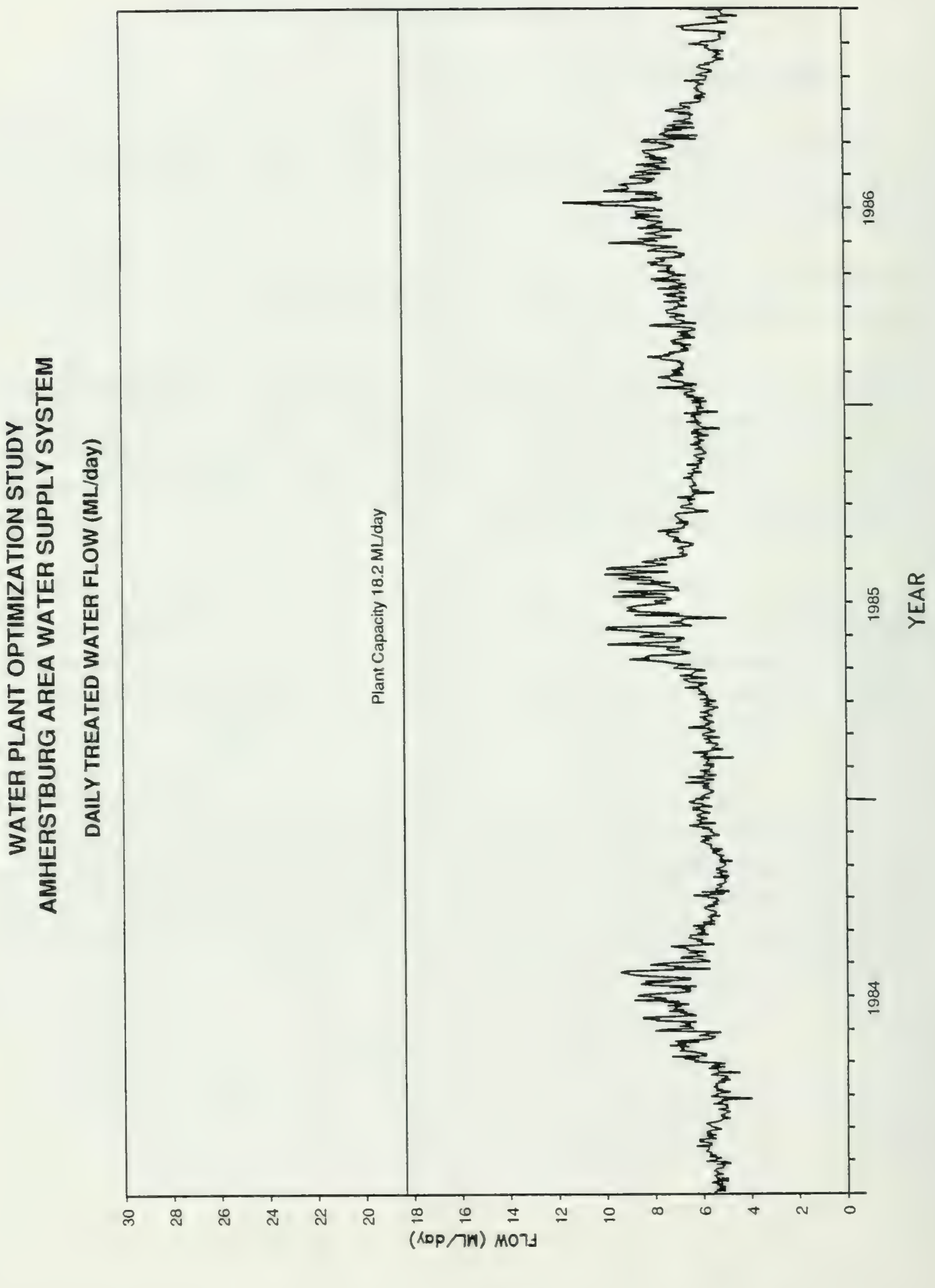

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG AREA WATER SUPPLY SYSTEM
DAILY TREATED WATER FLOW (ML/day)
Plant Capacity 18.2 ML/day
FLOW (ML/day)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
1984
1985
1986
YEAR

Figure Nº 7

D.2 Flow Control

To some extent, operation of the plant is simplified because the system demand is substantially below the treatment plant capacity. In 1986 the maximum day demand was approximately 64% of the plant capacity, and the demand was less than 50% of the plant capacity for all but seven days. In addition, the relatively large volume of treated water storage makes the task of matching treatment rate to demand less critical.

With respect to the rate of treatment, the operational objective is to keep the underground reservoir and the elevated water tank as full as possible. Depending on the level in the reservoir, the weather, and the time of year, the plant staff estimates from previous experience the anticipated daily demand. The operator sets the appropriate number of filters in operation and adjusts the filter effluent valves to give the desired filter flow rates.

Because of the low system demand only one of the two smaller low lift pumps needs to be running, and the operator will select one of them for duty.

Flow from the low lift pump is controlled by a butterfly valve in the low lift pump discharge main which is automatically regulated to maintain a preset water level in the filters. The clarifier level is self regulated by a weir on the clarifier effluent.

The plant is operated in such a manner that filters are always in operation, and are manually adjusted to increase or decrease the filtering rate depending on the level in the underground reservoir.

The high lift pumps are controlled automatically by a signal from the elevated water storage tank that starts a pump at a pre-determined low water level and stops it at a high level. Again, because of the low system demand only one of the two smaller high lift pumps needs to be selected for duty.

D.3 Disinfection Practices

Disinfection is accomplished by the use of chlorine. Liquid chlorine is stored in 0.9 tonne (2,000 lb) containers and is put into solution with water through the use of gas chlorinators and ejectors. The Plant has three chlorinators for pre, post and standby chlorination and a fourth chlorinator, originally used for chlorine dioxide generation, is available for emergency use.

Chlorine solution for pre-chlorination is added to the treatment stream in the filter influent channel with the objective of having a 0.60 mg/L free chlorine residual in the filter effluent.

Post-chlorination chlorine solution is added at the inlet to the high lift pump well in quantities to yield a free residual of 0.80 mg/L in the plant effluent.

Chlorine feed rates are set manually and are adjusted, when required, to correct for deviations from the residual objectives. Although residuals are determined and recorded six times per day (ie. twice per shift) additional tests are done to verify acceptable residuals are being obtained after chlorine feed rates have been adjusted to account for flow or water quality changes. Results of these additional residual tests are not recorded.

The plant does not have facilities for determining the separate amounts of chlorine used for pre and post-chlorination. Total chlorine dosage (ie. pre and post) is determined daily based on the weight of chlorine used and the plant production. The dosages recorded for post-chlorination are based on the difference between the free residual in the plant effluent and the free residual in the filter effluent. The rationale for the validity of this determination is based on tests conducted at the plant which indicate there is no loss of chlorine in the reservoir.

D.4 Operation of Specific Components

a) Intake

The plant has an intake structure located 60 m (200 ft) from the shore of the Detroit River and is connected to the plant's low lift pump well by 155 m (510 ft) of 900 mm (36 in) dia. reinforced concrete pipe.

The intake structure has steel outer and inner shells and the space between them is filled with concrete. The inner shell forms a tapered transition from the water inlet to the inlet to the intake pipe.

Water enters the intake structure through a vertical opening 6.1 m (20 ft) wide and 1.5 m (5 ft) high which has vertical bars spaced at 300 mm (12 in).

The current in the river is very swift which eliminates any problems of sedimentation. Plant staff indicates there have not been any problems related to ice or collection of debris at the intake structure.

b) Screening

The low lift pump well inlet has a 2.44 m (8 ft) wide vertical bar screen with 90 mm openings and a 1.83 m (6 ft) wide travelling water screen with 9.5 mm (0.375 in) mesh.

The bar screen seldom requires cleaning. The travelling water screen is operated manually for approximately 5 minutes once every day to exercise it. The screenings, if any, removed by the water sprays drain to the river through the plant storm sewer system.

c) Low Lift System

The low lift system is comprised of a 9.45 m x 9.14 m x 6.6 m (31 ft x 30 ft x 21.76 ft) deep reinforced concrete pump well and three Johnston Vertical Turbine pumps having capacities of 9.27, 9.27 and 22.9 ML/d (2, 2 and 5 mgd). All the pumps have constant speed electric motors.

One of the smaller pumps is in operation at all times and has sufficient capacity for the system demand. LL-1 and LL-2 are alternated monthly as duty pump. Low lift pump operation is manual except for automatic shut-down on low level in the pump well and high level in the filter inlet channel.

Raw water flow is controlled by a butterfly valve in the piping which is regulated automatically to maintain a preset level in the filter inlet channel.

d) e) f) Clarification

Clarification is accomplished in a Graver solids contact up flow type clarifier 19.82 m (65 ft) dia. by 4.9 m (16 ft) side water depth. Clarifier effluent is collected through orifices in submerged radial pipes which discharge to a circular launder around the outside of the detention cone. Weirs at the ends of the collector pipes maintain proper water level in the clarifier.

Settled sludge is moved to a central hopper by bottom scrapers and the sludge blow-down valve is opened for a timed period at various times during the day. During typical summer operation, the blow down valve would be opened for 3 minutes four times a day. The duration and frequency of sludge removal depends on raw water quality and flowrate and the results of 10 minute settling tests carried out on samples taken from the lower draft tube four times per day. The plant staff endeavours to regulate sludge removal to maintain approximately 20% sludge by volume, thus maintaining an appropriate sludge blanket level. From past experimentation, plant staff have been found that minor adjustment of the turbine speed (9-12 RPM) is required to maintain the required sludge density.

There are no facilities for measuring the quantity of sludge removed from the clarifier and values recorded on the operating data sheets are estimated based on hydraulic calculations.

The clarifier was taken out of service for approximately 6 weeks in 1984 for inspection and painting. Raw water was by-passed directly to the filters. During this time coagulant feed was discontinued and a polymer was added prior to filtration.

Wind induced currents frequently cause increased effluent turbidity. During the winter months, heat lamps are used to prevent ice build-up at the weirs in the effluent launder. Attached filamentous algae growth is not a significant problem and it is removed with high pressure hoses once a month during the summer.

Since every effort is made to operate the plant at a continuous flowrate the clarifier is not subjected to frequent flow surges.

g) Filters

The plant has four independent dual media (ie. sand/anthracite) filters with gravel support on Miller Block underdrains. Each filter is 4.88 m x 7.93 m (16 ft x 26 ft) and has two rotary surface washers.

Filter flow is measured by a venturi in the filter effluent piping and flow is controlled by a butterfly valve downstream of the venturi. The desired filtering rate is set manually on the filter flow controller and the butterfly control valve adjusts automatically to maintain a constant flowrate. Water level in the filter is maintained at the proper elevation by the raw water control system which automatically increases or decreases flow to the filters to keep the filter level constant.

The filter throughput varied from a minimum of 3.52 ML/d to a maximum of 5.86 ML/d. Filter headloss varied from 0.3 m (1 ft) for a clean bed to 2.13 m (7 ft) for a dirty bed.

The decision to backwash is made on the basis of filter effluent turbidity, run time and head loss. Filters are backwashed after 72 hours unless filter effluent turbidity reaches 0.2 FTU before 72 hours have elapsed. Samples for filter effluent turbidity are taken from the filter clearwell (ie. combined effluent) and if backwashing is required because of high turbidity, the filter having the longest run time is backwashed first. Minimum run time is 24 hours. The criteria for acceptable turbidity is based on a 1986 instruction from the London Regional Office to maintain plant effluent turbidity less than 0.2 FTU. Prior to 1986, the plant was operated with two filters in operation. In order to be able to comply with the new standard, the number of filters in service was charged from two to three.

Following is a brief description of backwash procedure:

- Close inlet valve.
- Open backwash drain and allow filter level to fall to approximately 150 mm (6 in) above media.
- Close filter effluent valve.
- Start backwash pump and slowly increase flow to 14.1 m/h (2,000 gpm).
- Start surface washers and turn-off after approximately 2 minutes.
- Increase backwash flow slowly to 35.3 m/h (5,000 gpm) and maintain for approximately 20 minutes until the operator visually determines the backwash can be terminated.
- Decrease backwash flow gradually.
- Turn off backwash pump.
- Close backwash drain.
- Open filter inlet to allow filter to fill to operating level.

Backwash waste water drains directly to the Detroit River. In normal conditions, a backwashed filter is not placed in service for 24 hours.

Prior to assuming the operation of the Anderdon and Sandwich West Sewage Works systems, the filter media would be inspected and the filter disinfected on a yearly basis. The plant superintendent indicates sufficient staff time is not available now for continuing the inspection and disinfection program.

Samples for filter effluent turbidity are taken where the filter clearwell discharges to the reservoir and recorded turbidity values are for the combined filter effluent. Because of the retention time in the clearwell, filter effluent turbidity is not indicative of current conditions. In addition, measured turbidity may be lower because the clearwell provides opportunity for settling. Based on the minimum and maximum daily flows in 1986, the corresponding lag times are 8 hours and 3 hours respectively.

h) High Lift Pumping

To facilitate cleaning and pump maintenance, the High Lift pump well is divided in two sections with an interconnecting sluice gate. The two smaller high lift pumps and the filter backwash water pump are installed in one section (HL Well No. 1) and the largest high lift pump in the other (HL Well No. 2). In normal operation, the interconnection between the wells is open and water from the reservoir flows into HL Well No. 2. A by-pass is provided to allow water from the filter clearwell to flow into HL Well No. 1. There are diffusers for post-chlorination and fluoridation at each entrance to the high lift wells.

The capacity of only one of the smaller high lift pumps is required to meet the system demands. The water level in the elevated water storage tank is transmitted to the plant over dedicated telephone wires and the duty high lift pump is started on a low tower level and stopped on high tower level. HL-1 and HL-2 are alternated monthly as duty pump. Selection of the duty pump is done manually.

The pump wells and reservoir are not drained and inspected on a regular basis due to the lack of available staff time. The plant superintendent advised there is leakage through some of the reservoir expansion joints as evidenced by chlorine residuals in the water in the drainage system.

D.5 Chemicals

a) Coagulant

Liquid alum is fed into the low-lift pump discharge main just downstream of the pump discharge connections to the header. Prior to June 1987, alum was added to the raw water at the clarifier inlet. The plant superintendent indicates the new alum addition location has improved clarification.

Over the years plant staff has conducted numerous jar tests and from this experience alum dosage is normally determined based on the operator's previous experience, taking into account raw water turbidity and temperature. Since the plant is operated on a constant flow basis, alum feed rate is changed only if a substantial change in raw water turbidity occurs. In this event jar tests are carried out, and the alum feed rate is adjusted to give the desired dosage.

All changes in alum feed rate are done manually although the original plant construction allowed for automatic operation of the alum system.

The average alum dosage is calculated daily from the measured amount of alum used and the sum of the daily plant output, backwash water used and clarifier blowdown. Because of the water loss from the reservoir the calculation gives a higher than actual alum dosage.

b) Coagulant Aid

Alchem 86070 non-ionic polymer is used as a coagulant aid. The coagulant aid is added in a 0.11% solution to the center mixing section of the clarifier.

According to plant staff, required coagulant aid dosages were determined from jar tests. Plant records indicate the same amount of polymer is fed daily. The polymer feed rate is adjusted in response to turbidity changes only.

c) Filter Aid

Filter aids have been used on an intermittant basis in conjunction with coagulants and alone for direct filtration. Filter aids have been used continuously since the 0.2 FTU turbidity criteria was initiated in 1986. Alchem 8184 non-ionic polymer is used as a filter aid. The filter aid is added in a 0.11% solution to the filter influent.

According to plant staff, required filter aid dosages were determined from jar tests. Plant records indicate the same amount of polymer is fed daily. The filter aid feed rate is adjusted in response to turbidity changes.

d) Fluoride

Commercial strength (25%) hydrofluosilicic acid is stored in a 6.82 m^3 (15,000 gal) rubber-lined steel tank. A solution is prepared by mixing 45.45 kg (100 lb) of the commercial acid with 99.45 kg (220 lb) of water in a 0.20 m^3 (44 gal) polyethylene day tank. The system is completely enclosed and vented to the exterior to eliminate fumes. The diluted solution is fed to the high lift pump well influent with the metering pump adjusted to give 1.0 to 1.4 mg/L fluoride residual in the plant effluent. Only one high lift pump is on at any one time and it is therefore unnecessary to adjust the fluoride feed rates to account for changes in flow. The amount of acid used per day and the daily plant effluent flow are used to calculate the average daily fluoride dosage.

e) Activated Carbon

The activated carbon feed system is operated intermittently for a preset time every hour to give a dosage of approximately 5 mg/L. Intermittent operation is used to save wear and tear on the equipment caused by the abrasiveness of the carbon. The plant superintendent advises that because of the retention time in the clarifier intermittent operation is effective. From January 1st, 1986 to February 17, 1986, activated carbon was fed at a rate of 32.6 kg/d (72 lb/d), and at a rate of 46.3 kg/d (102 lb/d) for the remainder of the year. Carbon is fed without regard to raw water flow, the actual dosage varies from 3.5 to 8.7 mg/L.

f) Pre-Chlorination

Chlorine solution is added to the filter influent at a dosage to maintain approximately 0.60 mg/L free chlorine residual in the filter effluent. Pre-chlorine feed rate is adjusted manually.

g) Post-Chlorination

Chlorine solution is added to the high lift pump well influent and dosage is adjusted manually to maintain approximately 0.80 mg/L free chlorine residual in the plant effluent.

The average chlorine dosage is calculated daily from the weight of chlorine used and the daily plant effluent flow. The weights of chlorine used for pre-chlorination and post-chlorination cannot be measured separately, and the amount of chlorine assigned to post-chlorination is based on the difference between the free chlorine residual in the plant effluent and the free chlorine residual in the filter effluent.

D.6 Sampling and Data Collection

Table 11 summarizes the testing and data recording procedures at the plant.

Samples for bacteriological examination are collected and sent to both the Ministry of the Environment Laboratory in London and the Ministry of Health Laboratory in Windsor. Samples are collected as follows:

	Number of Samples	
Location	**MOH - Windsor (weekly)**	**MOE - London (weekly)**
Raw	1	1
Treated	1	1
Amherstburg Distribution System	3	1
Anderdon Distribution System	2	1*
Malden Distribution System	2	1*

* alternate weeks

A copy of the plant's sampling protocol is included in the appendix.

TABLE 11

SAMPLING AND TESTING SUMMARY

AMHERSTBURG AREA WATER TREATMENT PLANT

TEST	CHEMICAL APPLICATION POINT	SAMPLING POINT	TESTING FREQUENCY	RECORDING INSTRUMENT	TESTING
Raw Water Turbidity	-	Low Lift Pump Well (Display Jars)	6 times/day	6 times/day	Hach-Model 2100A Turbidimeter
Clarifier Effluent Turbidity	-	Filter Influent (Display Jars)	6 times/day	6 times/day	Hach-Model 2100A Turbidimeter
Filter Effluent Turbidity (Combined)	-	Reservoir Inlet (Display Jars)	6 times/day	6 times/day	Hach-Model 2100A Turbidimeter
Plant Effluent Turbidity	-	Discharge Header (Display Jars)	6 times/day	6 times/day	Hach-Model 2100A Turbidimeter
Pre-chlorination Residual	Filter Influent	Reservoir Inlet (Display Jars)	6 times/day (free)	6 times/day	Wallace & Tiernan Amperometric Titrator
Post-chlorination Residual	High Lift Well Inlet	Discharge Header (Display Jars)	6 times/day (free) 3 times/day (total)	6 times/day 3 times/day	Wallace & Tiernan Amperometric Titrator
Fluoride	High Lift Well Inlet	Discharge Header (Display Jars)	6 times/day	6 times/day	Hach Colorimeter Model 19188
pH Measurements	-	Low Lift Pump Well High Lift Discharge Header	Once/day	Once/day	Analytical Model 707B

D.7 Process Automation

Although the plant was designed to be fully automatic, it is operated, for the most part, manually.

Operating data is manually entered into Lotus 1-2-3 for record keeping purposes. Preventive maintenance programs are also stored on Lotus.

D.8 Daily Operator Duties

The Appendix contains a copy of the plant "Correct Procedures for Shift Operators" which outlines the operators' duties. In addition, the duty operator carries out the following tasks:

1. At beginning of shift, liaises with operator coming off duty and reviews operating log for previous shift.

2. Makes rounds three times per shift. (See Appendix for duties.)

3. Collects samples and tests for turbidity, chlorine and fluoride residuals twice per shift and records results in the daily log.

4. Collects samples and makes additional tests to verify chemical dosage or feed rate adjustments (results not recorded).

5. Takes readings from control panel instruments and records them on "Daily Summary Sheet" every one-half hour.

6. Monitors processes and makes adjustments as required.

7. Assists in preparing samples for shipment. (1)

8. Assists superintendent, electrician and mechanic. (1)

9. General plant cleaning.

10. Prepares batches of chemicals.

11. Enters records in computer (Lotus 1-2-3).

12. Backwashes filters. (3)

13. Records data and calculates daily flows and chemical usage. (3)

14. Secures and cleans plant vehicles, locks building and gates. (2)

15. Operates travelling water screen. (2)

(1) Indicates duty of day shift only.
(2) Indicates duty of afternoon shift only.
(3) Indicates duty of midnight shift only.

During the afternoon and midnight shifts when only one person is on duty, an audible alarm sounds every 30 minutes. If the operator fails to cancel the alarm after 15 minutes, a signal is transmitted to a security company (Wackenhut) which in turn contacts the "on call" operator.

Because of the heavy workload, the preventive maintenance program established when the plant was put into operation has been abandoned, and repairs are made as they are required.

The diesel engine generator set is exercised monthly under full load conditions.

SECTION E
PLANT PERFORMANCE

E.1 Particulate Removal

Particulate removal during the study period was good. The plant effluent turbidity exceeded the Ontario Drinking Water Objective of 1 FTU on fourteen days during the study period. Eight of these occurrences were on consecutive days in March 1984 during a period of high turbidity. Maximum, minimum and average plant effluent turbidity were 2.9 FTU, 0.02 FTU and 0.24 FTU respectively.

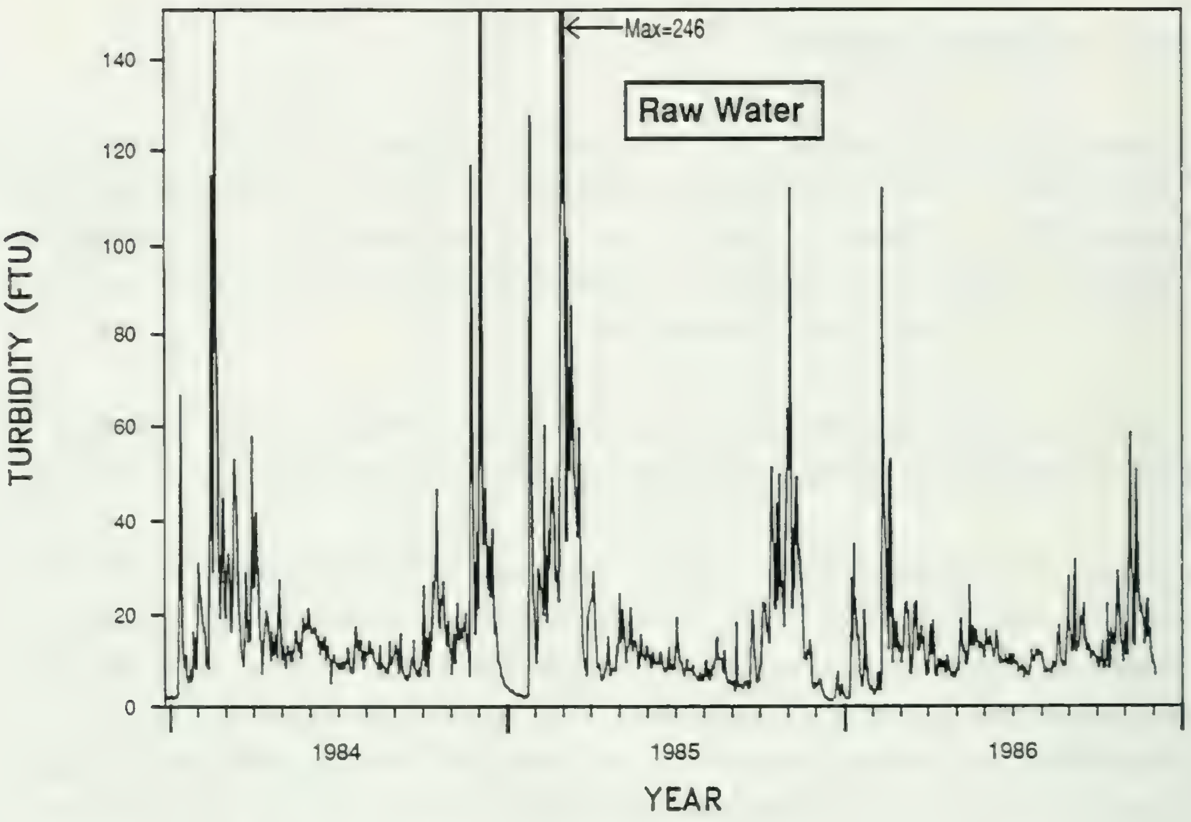
Table 12 gives a summary of raw and settled water turbidities for the three year study period (1984-1986). Figure 8 shows raw and treated water turbidity graphically.

In early 1986 the Regional operations officer requested that the plant effluent turbidity be kept at 0.20 FTU or lower. Table 13 gives a summary of filter effluent and plant effluent turbidities for the three year study period (1984-1986) and for 1986. A comparison of data indicates that in 1986 occurrences of high turbidity (ie. greater than 0.7 FTU) were eliminated and generally lower turbidities were obtained a greater percentage of time than for 1984-1986. Extremely low turbidities in October 1985 and a similar phenomenon in the fall of 1986 indicates that further optimization may be possible. No cause-effect relationships are evident. A study during October in a future year may be of value.

Treated water turbidity exceeded 1.0 FTU on 14 days during the study period. Eight of these occurences were in March 1984 when raw water turbidity was very high. Two of the occurences were in September 1984 when the clarifier was out of service. One of the occurences was in January 1985 during a period of very high raw water turbidity. Two of the occurences were in November 1984 on consecutive days where it appears that for some reason or other, the settled water turbidity was higher than normal. The other occurence was in January 1984 where there does not seem to be any particular reason for the exceedance. It should be noted that filter effluent turbidities are determined on a combined effluent sample at the outlet end of the filter clearwell. If more than one filter is in operation, this procedure does not indicate if the effluent from one or more of the filters exceeds acceptable values. It should also be remembered that prior to 1986 plant

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG AREA WATER SUPPLY SYSTEM

DAILY TURBIDITY (FTU)



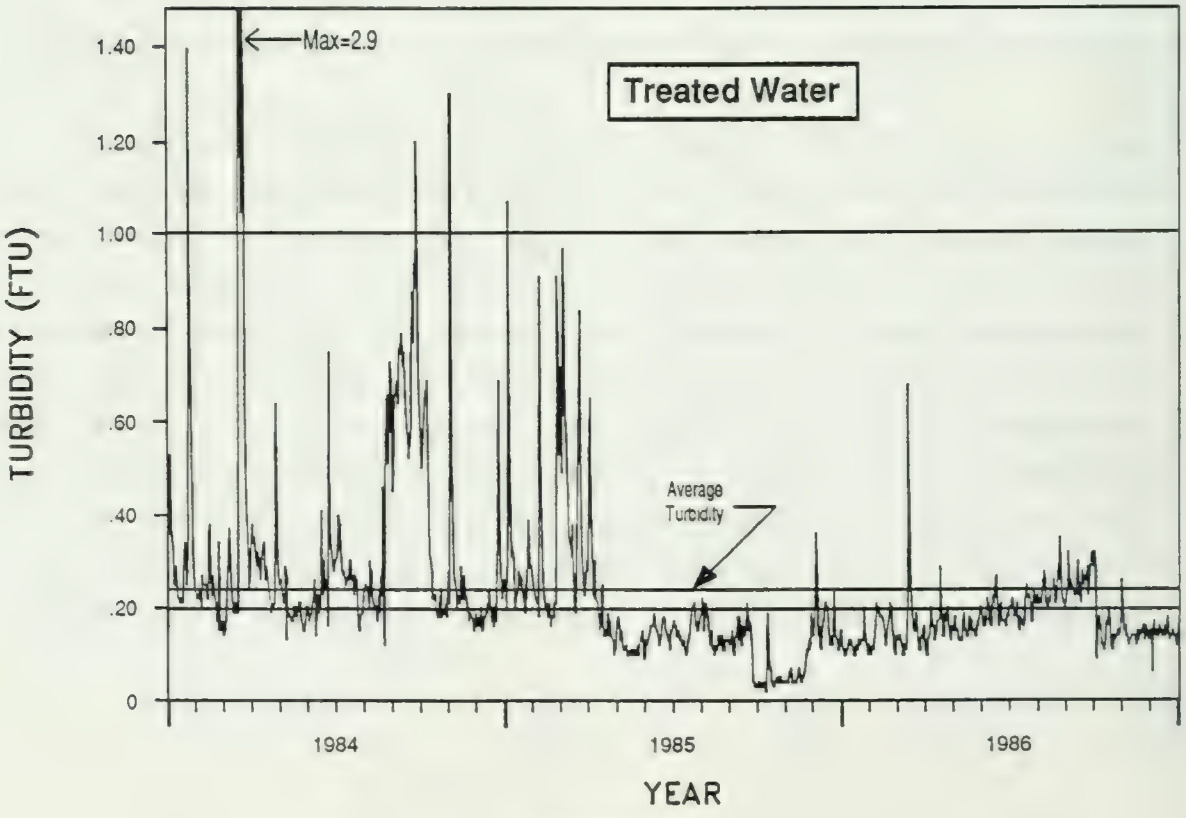


Figure Nº 8

TABLE 12

RAW AND SETTLED WATER TURBIDITY SUMMARY 1984-1986

AMHERSTBURG AREA WATER TREATMENT PLANT

	Raw (FTU)	Settled (FTU)
Minimum	1.3	0.14
Maximum	246	51
Average	17.1	8.6

Turbidity equal to or less than (FTU)	Percent of Time	
	Raw	Settled
200	99.9	100
150	99.5	100
100	98.4	100
50	95.1	99.6
25	84.2	99.4
15	65.6	98.3
10	40.4	96.7
5	10.3	90.8
2	<1	72.2
1	0	34

TABLE 13

FILTER AND PLANT EFFLUENT TURBIDITY SUMMARY AMHERSTBURG AREA WATER TREATMENT PLANT

	Filter Effluent		Plant Effluent	
	1984-86	1986	1984-86	1986
Minimum	0.02	0.09	0.02	0.06
Maximum	3.7	0.63	2.9	0.68
Average	0.23	0.21	0.24	0.18

Turbidity Equal to or less than (FTU)	Percent of Time Filter Effluent 1984-86	Percent of Time Filter Effluent 1986	Percent of Time Plant Effluent 1984-86	Percent of Time Plant Effluent 1986
2	99.6	100	99.7	100
1	98.9	100	98.7	100
0.7	96.6	100	96.5	100
0.6	94.8	99.5	93.9	99.7
0.5	93.2	99.5	91.9	99.4
0.4	91.6	97.3	90.4	99.4
0.3	86.6	96.4	84.8	97.3
0.25	80.0	94.8	75.8	90.7
0.2	61.22	72.9	58.0	73.7
0.15	35.6	45.5	34.1	44.4
0.1	6	3.8	7.5	3.5
0.05	4	0	4.1	0

effluent turbidity objective was 1.0 FTU or less and it is not surprising that the objective would be exceeded on a few occasions.

Efficiency of particulate removal in the clarifier is reduced during moderately high raw turbidities when the water is cold. A number of polymers and coagulants have been tested and nothing has been found to date to substantially improve the cold water performance of the clarifier. High winds cause waves in the clarifier and induce currents which increases clarifier effluent turbidity.

It is difficult to assess the efficiency of the filters because turbidity tests are not carried out on the effluent from each filter. The filter effluent turbidities are taken from the filter clearwell outlet which reflect the combined filter effluent turbidity. Because of the storage volume in the clearwell the lag time in testing could be as much as 8 hours.

Coagulant aid and filter aid are added at constant feed rates regardless of treatment rate and turbidity. Particulate removal might be improved by varying the dosages of these chemicals.

Chemical application rates are based on settings on the various items of feed equipment and not on actual dosage rates. During a shift the operator knows, for example, that the chlorine feed rate is 14 kg/d (30 lb/d) but does not know the dosage in mg/L. Actual dosage rates are not known until they have been calculated from daily chemical usage and flows. While it is possible to operate satisfactorily in this manner, it would be beneficial for the operator to know the dosage rates of chemicals being used throughout the day.

The records indicate the occurrence of relatively high raw water pH. The absence of data on aluminum residuals does not allow determining if coagulation is occurring within optimum limits. An aluminum residual and pH testing program would be useful to determine if coagulation is being optimized and whether pH of the raw water should be lowered.

Two streaming current meters have been tested at the plant and were effective in indicating the need for coagulant dosage adjustment. While the plant superintendent feels such a device would be a valuable operational tool, it is difficult to justify its high cost (ie. approximately $10,000.00) without knowing the benefits.

As noted earlier, the fact that only combined filter effluent turbidity tests are done makes it difficult to assess the filter operation. It would appear however, that shorter filter runs would reduce effluent turbidity. Turbidity determination on the effluent of each filter would greatly assist plant operation.

E.2 Disinfection

Plant practise is to feed chlorine into the clarifier effluent to maintain a free chlorine residual of 0.60 mg/L in the filter effluent. Post-chlorination is carried out to maintain 0.80 mg/L free chlorine residual in the plant effluent as directed by the Regional Manager of Utility Operations.

The plant does not have facilities for measuring the separate weights of chlorine used for pre and post-chlorination. Pre-chlorination is carried out to produce free residual chlorine and tests indicate there is very little loss of free chlorine residual in the reservoir. The amount of chlorine assigned to post-chlorination is the difference between the free chlorine residuals in the plant effluent and filter effluent and daily dosage rates are calculated accordingly.

Bacteriological test results indicate the absence of coliforms in all samples of water leaving the plant and it can therefore be concluded the plant is capable of disinfecting the water to ensure a water quality in accordance with Ontario Drinking Water Objectives.

Approximately 10 years ago, the application point for pre-chlorination was changed from the clarifier influent to the clarifier effluent to reduce the formation of trihalomethanes. The data tables indicate that for 1986, maximum, minimum and average concentrations of Total Trihalomethanes were 54, 32 and 42 ug/L as compared to the Ontario Drinking Water Objective of 350 ug/L.

SECTION F

RECOMMENDATIONS

The report indicates particulate removal and disinfection at the plant are good. However, the following could be implemented to permit better monitoring of the processes and improve treatment efficiency.

No attempt has been made to evaluate staffing requirements at the plant and the recommendations are made based the assumption that sufficient staff time is available.

1. The primary and secondary flow elements should be calibrated, refurbished if necessary and the changes documented on a regular basis.

2. Plant performance could be more effectively monitored by installing continuous flow-through turbidimeters on raw water, clarifier effluent, each filter effluent, and plant effluent. The turbidimeters have been ordered. It is recommended that the turbidimeters be installed close to the sampling location to obtain representative results. Turbidity values could be transmitted to indicators in a convenient location in the control room and readings recorded hourly. This would allow determination of water quality trends for adjusting coagulant, shutting down filters etc.

3. Installation of calibration chambers on chemical pump suctions would make calibration of the pumps a relatively simple procedure.

4. It is recommended that a program be instituted in conjunction with the Ministry to experiment with dosages of coagulant and coagulant aid. The program should include jar testing and full scale testing with an objective of producing graphical charts that could be used as operational tools for adjusting chemical dosages.

   Pacing the feed rate of coagulant aid and filter aid to changes in flow and turbidity should be considered to improve particulate removal.

5. Carry out an aluminum testing program to determine if pH correction of the raw water is warranted to improve treatment and/or reduce aluminum residual in plant

effluent. Aluminium residual is an excellent operating tool for determining appropriate dosages. The program could be as follows:

- Make pH determination on raw water, clarifier mixing zone, clarifier effluent, filter effluent and plant effluent.

- On the same set of samples as in (1) above, test for aluminum residual.

6. A streaming current meter could be installed to optimize coagulant dosage.

   Results of testing streaming current meters may indicate SCM to be a useful operating tool for optimizing coagulant dosage. The SCM could be connected to adjust coagulant dosage. Optimum coagulant dosages for various raw water temperature and turbidity conditions could be recorded and graphical charts produced for use in the event the SCM is out of service. If this recommendation is implemented, the work involved in Recommendation No. 3 could be reduced.

7. As far as existing equipment will allow, change filter flow rates gradually.

8. Take filters out of service based on effluent turbidity.

9. Place all available filters in service when clarifier effluent turbidities are high.

10. Evaluate the effectiveness of the following on particulate removal in the filters subsequent to when individual turbidimeters are installed on each filter.

    (a) Filter to waste after backwashing. This would be possible through the filter drain.

    (b) Evaluate the filtering-to-waste after backwashing with a polymer in the backwash water during the later stages of backwashing versus the addition of polymer to the top of the filter at the start of the filter operation.

    (c) Experiment with varying backwash flowrates and durations.

11. In order to eliminate the detrimental effects of wind induced currents which upset the clarifier and the possible contamination of the water in the clarifier from atmospheric pollution from nearby industry, it is recommended that the clarifier be covered. This will also reduce ice problems during the winter.

12. Record the following on an hourly basis:

    - Filter run time
    - Cumulative volume filtered for each filter
    - Turbidity of raw water, filter influent, filter effluent and plant effluent

13. Further development of the use of an electronic spread sheet for tabulating data would allow for preparing graphical representation of parameters which would be an aid to plant operation and for comparing results of changes in chemical dosages and other operating procedures.

14. Reinstate preventive maintenance program including annual inspection and disinfection of filters.

15. Provide the means to separately measure the amount of chlorine used for pre and post-chlorination.

16. Inspect pump wells and reservoir to address suspected leakage problems.

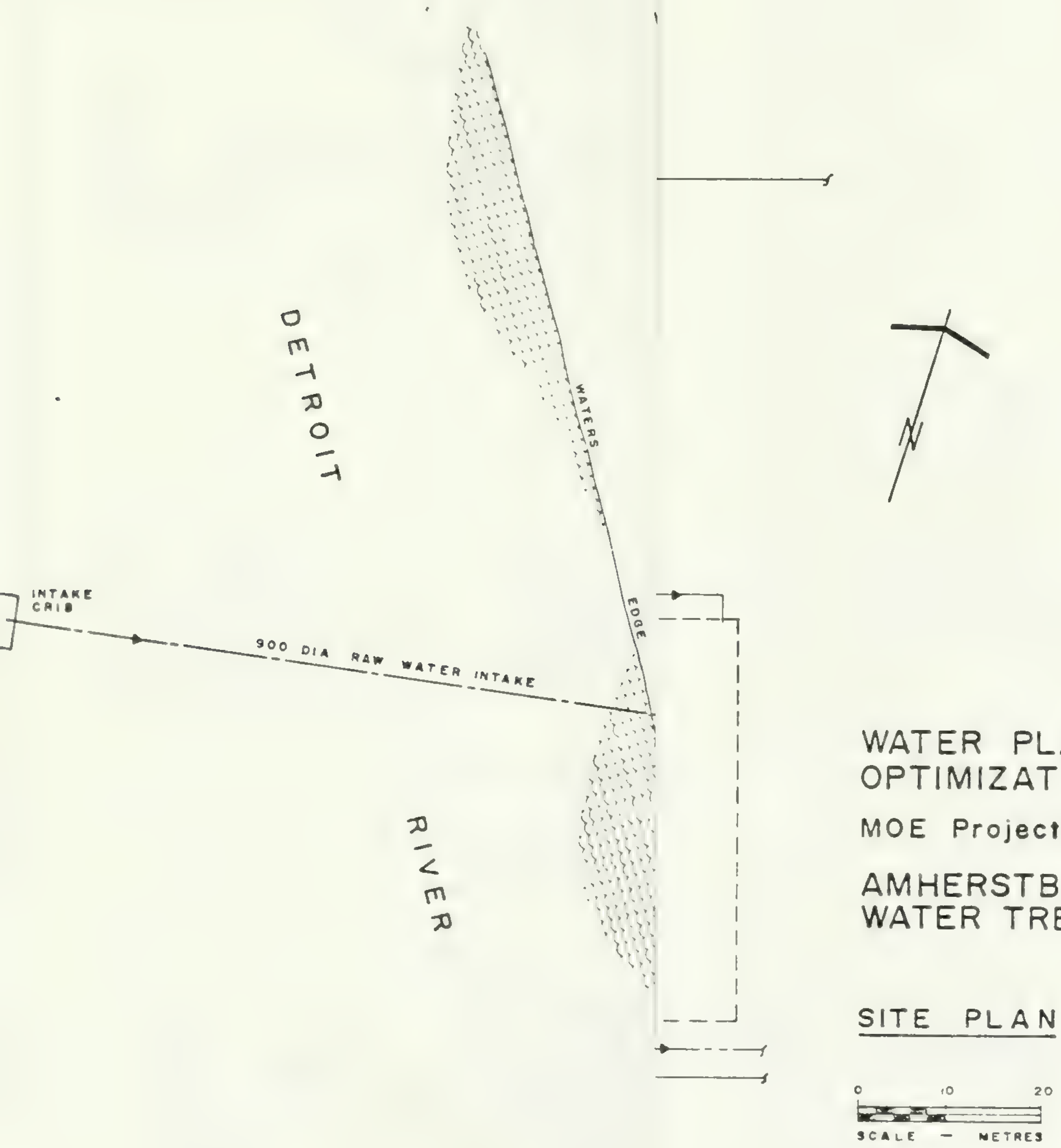
17. Conduct a study during the month of October to determine the reasons for the very low turbidities experienced at this time of the year.

18. For better operational control, chemical application throughout the plant should be based on dosages rather than on the amount of chemical used per 24 hours as is presently the case.

19. Total chlorine residuals should be measured and recorded routinely throughout the plant.

APPENDIX A

Figure 3 Site Plan
Figure 4 Block Schematic
Figure 5A Process and Piping Diagram
Figure 5B Process and Piping Diagram



WATER PLANT
OPTIMIZATION STUDY

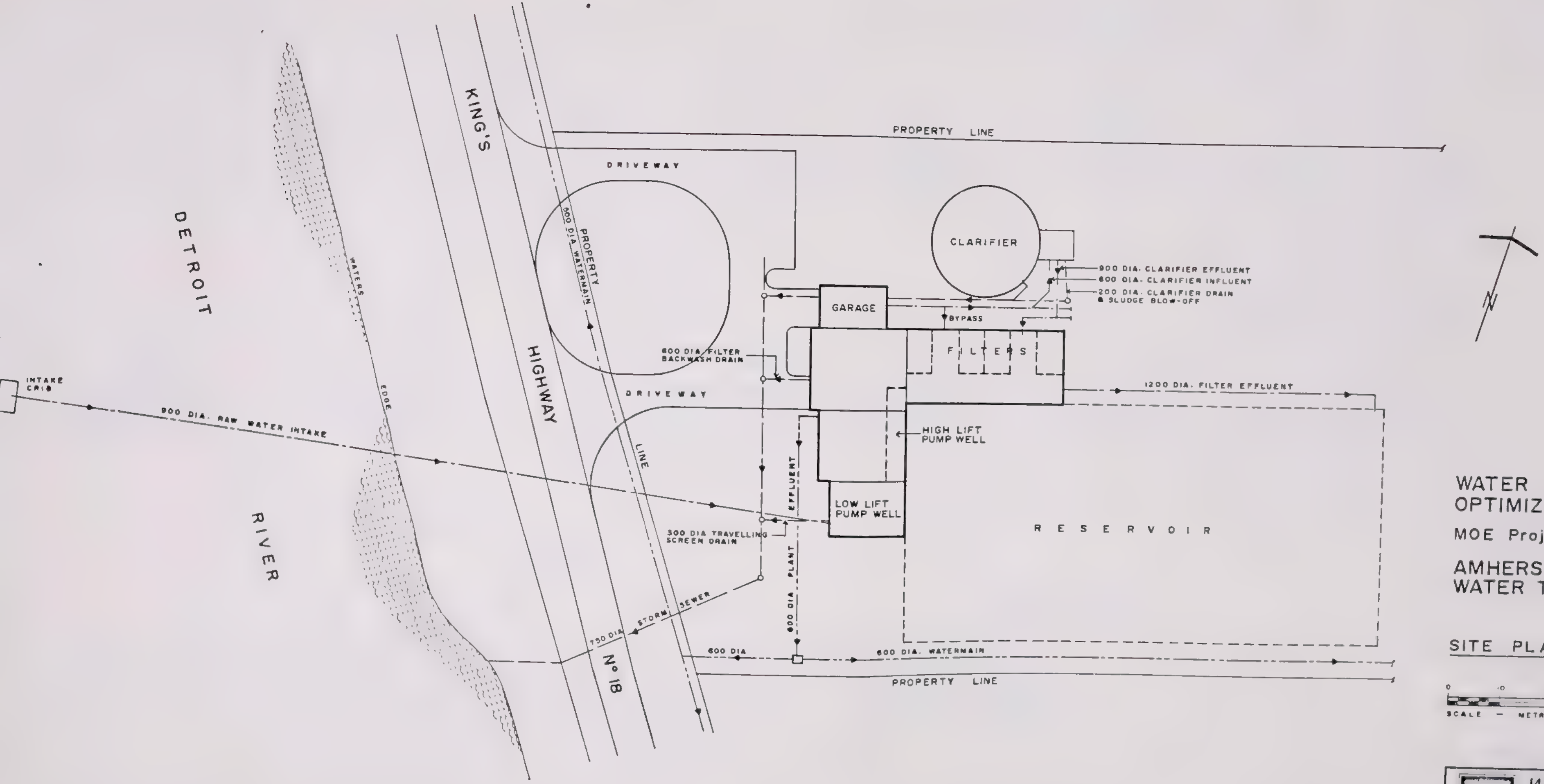
MOE Project N° 7-2031

AMHERSTBURG AREA
WATER TREATMENT PLANT

SITE PLAN

LA FONTAINE,
COWIE,
BURATTO
& ASSOCIATES
LIMITED
CONSULTING ENGINEERS

Date 1988·01·08
File N° WR 158 A
Figure N° 3



WATER PLANT OPTIMIZATION STUDY

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AMHERSTBURG AREA WATER TREATMENT PLANT

SITE PLAN

LA FONTAINE,
COWIE
BURATTO
& ASSOCIATES
LIMITED
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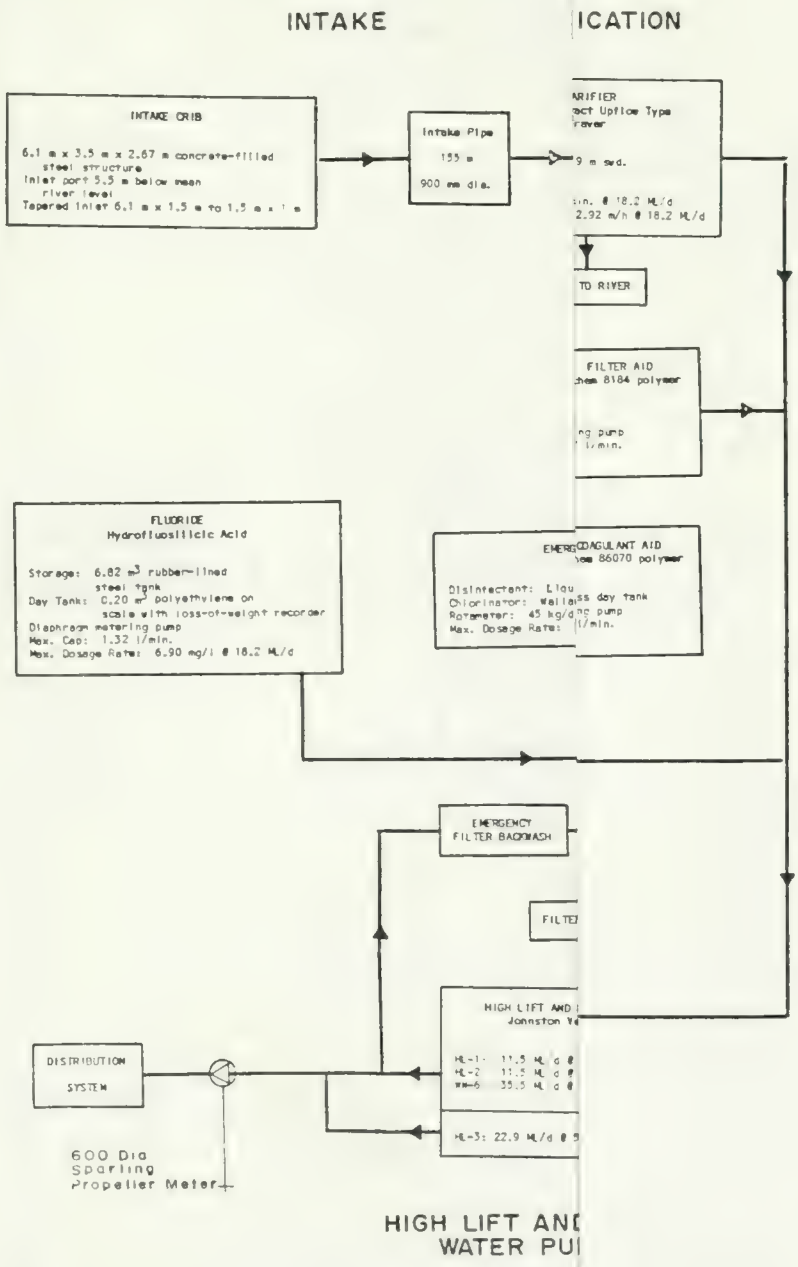
Figure Nº 3



WATER PLANT
OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA
WATER TREATMENT PLANT

BLOCK SCHEMATIC

LaFONTAINE,
COWIE,
BURATTO
& ASSOCIATES
LIMITED
CONSULTING ENGINEERS

Date 1988·01·08

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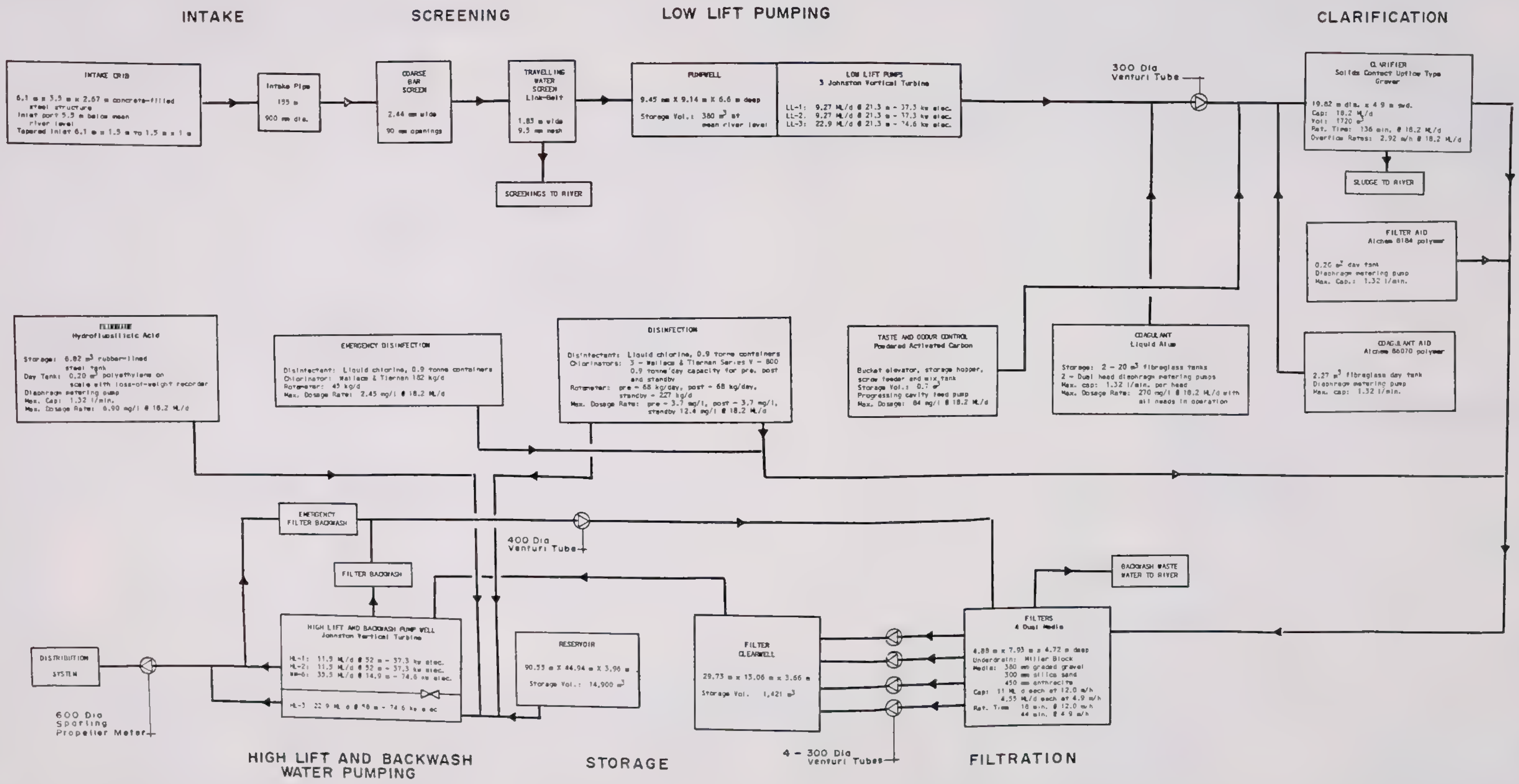
Figure N° 4


INTAKE
SCREENING
LOW LIFT PUMPING
CLARIFICATION
INTAKE CRIB
6.1 m x 3.5 m x 2.67 m concrete-filled steel structure
Inlet port 5.5 m below mean river level
Tapered inlet 6.1 m x 1.5 m to 1.5 m x 1 m
Intake Pipe
155 m
900 mm dia.
COARSE BAR SCREEN
2.44 m wide
90 mm openings
TRAVELLING WATER SCREEN Link-Belt
1.83 m wide
9.5 mm mesh
SCREENINGS TO RIVER
PUMPWELL
9.45 m X 9.14 m X 6.6 m deep
Storage Vol.: 380 m³ at mean river level
LOW LIFT PUMPS
3 Johnston Vertical Turbine
LL-1: 9.27 ML/d @ 21.3 m - 37.3 kw elec.
LL-2: 9.27 ML/d @ 21.3 m - 37.3 kw elec.
LL-3: 22.9 ML/d @ 21.3 m - 74.6 kw elec.
300 Dia Venturi Tube
CLARIFIER
Solids Contact Upflow Type
Graver
19.82 m dia. x 4.9 m swd.
Cap: 18.2 ML/d
Vol: 1720 m³
Ret. Time: 136 min. @ 18.2 ML/d
Overflow Rates: 2.92 m/h @ 18.2 ML/d
SLUDGE TO RIVER
FILTER AID
Alchem 8184 polymer
0.20 m³ day tank
Diaphragm metering pump
Max. Cap.: 1.32 l/min.
[illegible]
Hydrofluosilicic Acid
Storage: 6.82 m³ rubber-lined steel tank
Day Tank: 0.20 m³ polyethylene on scale with loss-of-weight recorder
Diaphragm metering pump
Max. Cap: 1.32 l/min.
Max. Dosage Rate: 6.90 mg/l @ 18.2 ML/d
EMERGENCY DISINFECTION
Disinfectant: Liquid chlorine, 0.9 tonne containers
Chlorinator: Wallace & Tiernan 182 kg/d
Rotameter: 45 kg/d
Max. Dosage Rate: 2.45 mg/l @ 18.2 ML/d
DISINFECTION
Disinfectant: Liquid chlorine, 0.9 tonne containers
Chlorinators: 3 - Wallace & Tiernan Series V - 800 0.9 tonne/day capacity for pre, post and standby
Rotameter: pre - 68 kg/day, post - 68 kg/day, standby - 227 kg/d
Max. Dosage Rate: pre - 3.7 mg/l, post - 3.7 mg/l, standby 12.4 mg/l @ 18.2 ML/d
TASTE AND ODOUR CONTROL
Powdered Activated Carbon
Bucket elevator, storage hopper, screw feeder and mix tank
Storage Vol.: 0.7 m³
Progressing cavity feed pump
Max. Dosage: 84 mg/l @ 18.2 ML/d
COAGULANT
Liquid Alum
Storage: 2 - 20 m³ fibreglass tanks
2 - Dual head diaphragm metering pumps
Max. cap: 1.32 l/min. per head
Max. Dosage Rate: 270 mg/l @ 18.2 ML/d with all heads in operation
COAGULANT AID
Alchem 86070 polymer
2.27 m³ fibreglass day tank
Diaphragm metering pump
Max. cap: 1.32 l/min.
EMERGENCY FILTER BACKWASH
400 Dia Venturi Tube
FILTER BACKWASH
BACKWASH WASTE WATER TO RIVER
DISTRIBUTION SYSTEM
600 Dia Sparling Propeller Meter
HIGH LIFT AND BACKWASH PUMP WELL
Johnston Vertical Turbine
HL-1: 11.5 ML/d @ 52 m - 37.3 kw elec.
HL-2: 11.5 ML/d @ 52 m - 37.3 kw elec.
BW-6: 35.5 ML/d @ 14.9 m - 74.6 kw elec.
HL-3 22.9 ML/d @ 58 m - 74.6 kw elec
RESERVOIR
90.53 m X 44.94 m X 3.96 m
Storage Vol.: 14,900 m³
FILTER CLEARWELL
29.73 m x 13.06 m x 3.66 m
Storage Vol. 1,421 m³
FILTERS
4 Dual Media
4.88 m x 7.93 m x 4.72 m deep
Underdrain: Miller Block
Media: 380 mm graded gravel
300 mm silica sand
450 mm anthracite
Cap: 11 ML/d each at 12.0 m/h
4.55 ML/d each at 4.9 m/h
Ret. Time 18 min. @ 12.0 m/h
44 min. @ 4.9 m/h
4 - 300 Dia Venturi Tubes
HIGH LIFT AND BACKWASH WATER PUMPING
STORAGE
FILTRATION

WATER PLANT
OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA
WATER TREATMENT PLANT

BLOCK SCHEMATIC

LA FONTAINE,
COWIE
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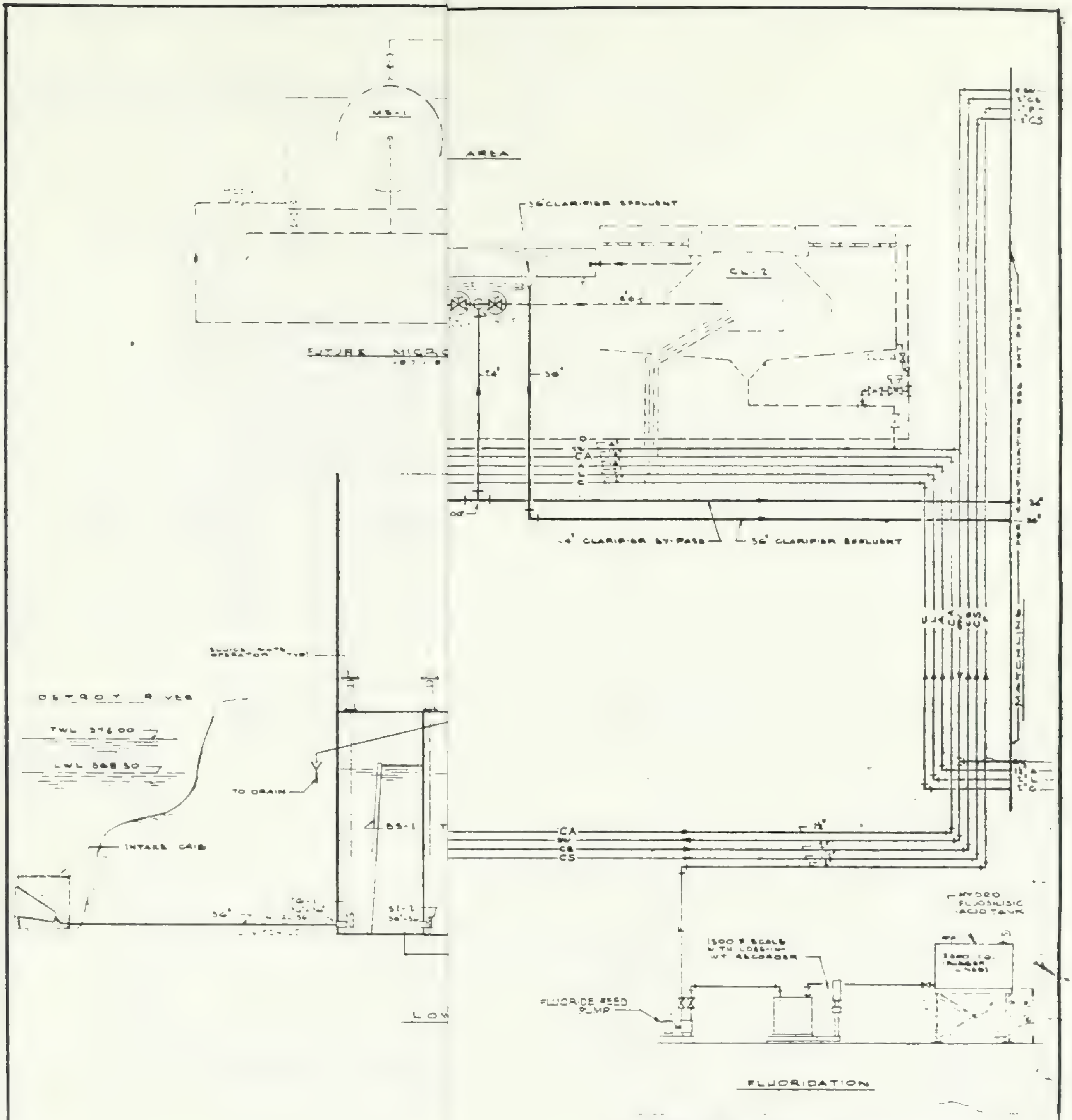
Figure N° 4



WATER PLANT OPTIMIZATION STUDY

MOE Project Nº 7-2031

AMHERSTBURG AREA WATER TREATMENT PLANT

PROCESS AND PIPING DIAGRAM

LA FONTAINE,
COWIE,
BURATTO
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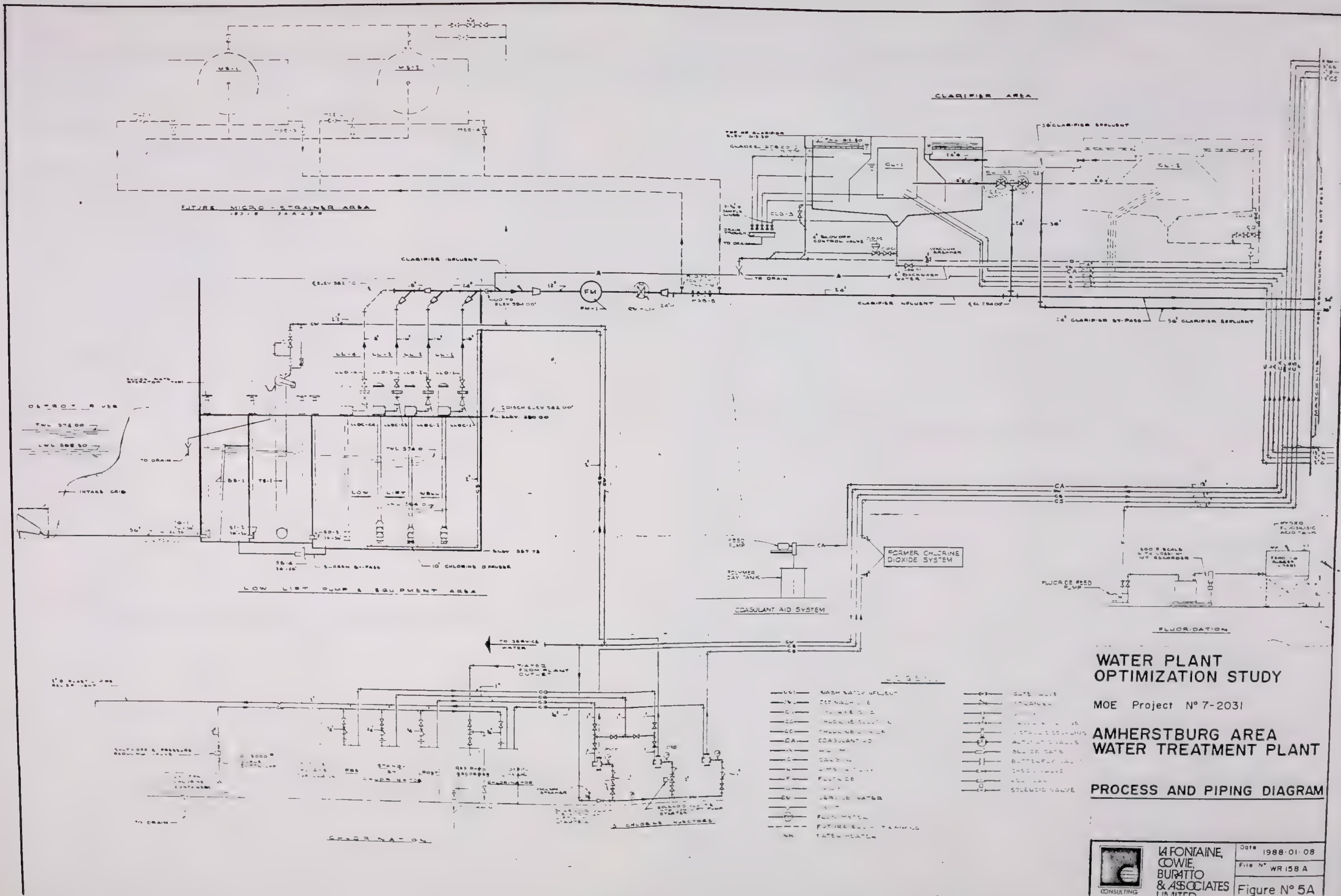

WATER PLANT OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA WATER TREATMENT PLANT

PROCESS AND PIPING DIAGRAM

CONSULTING

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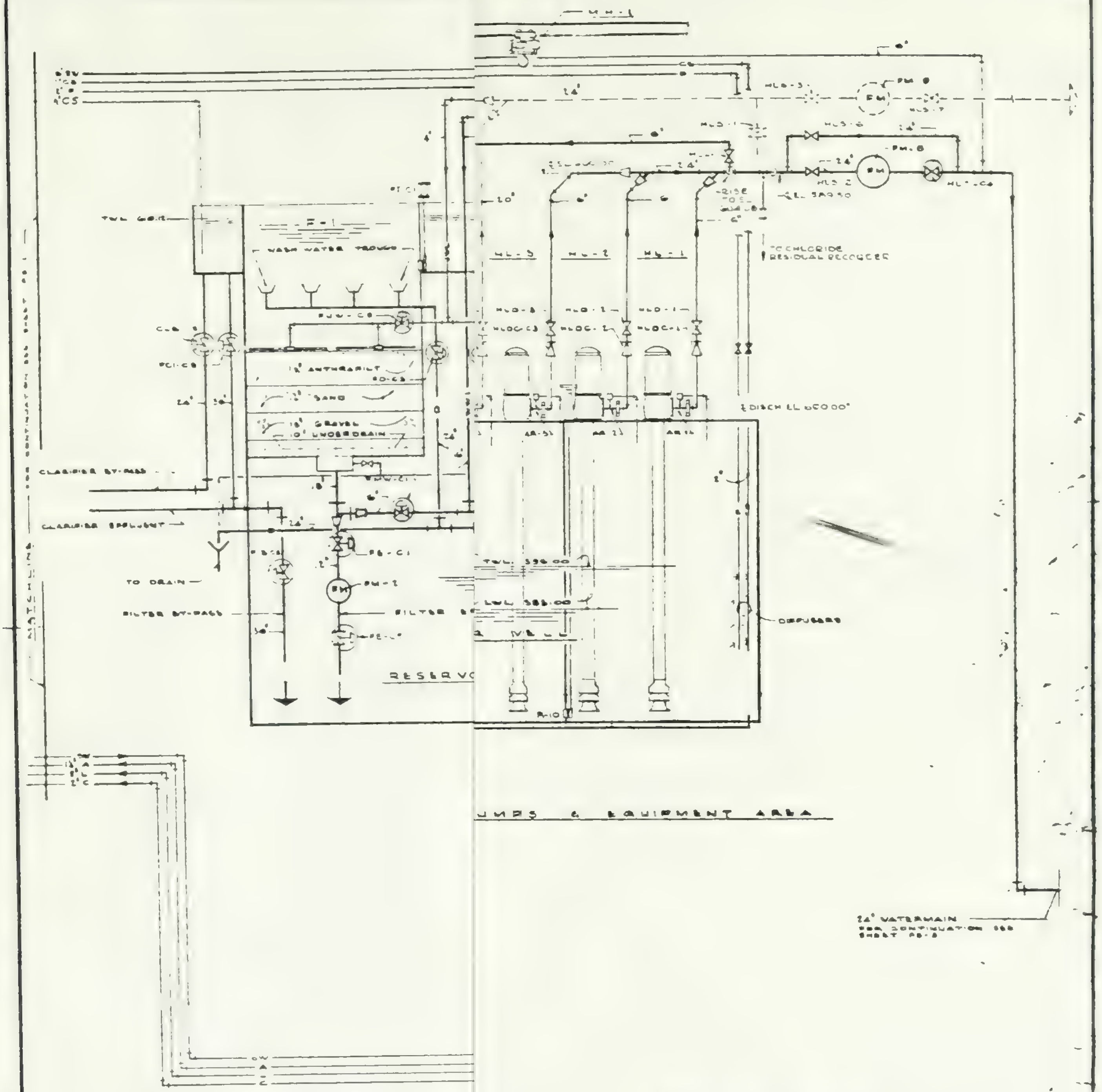

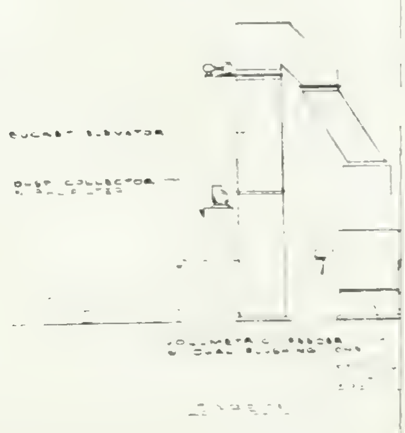

WATER PLANT OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA WATER TREATMENT PLANT

PROCESS AND PIPING DIAGRAM

LA FONTAINE,
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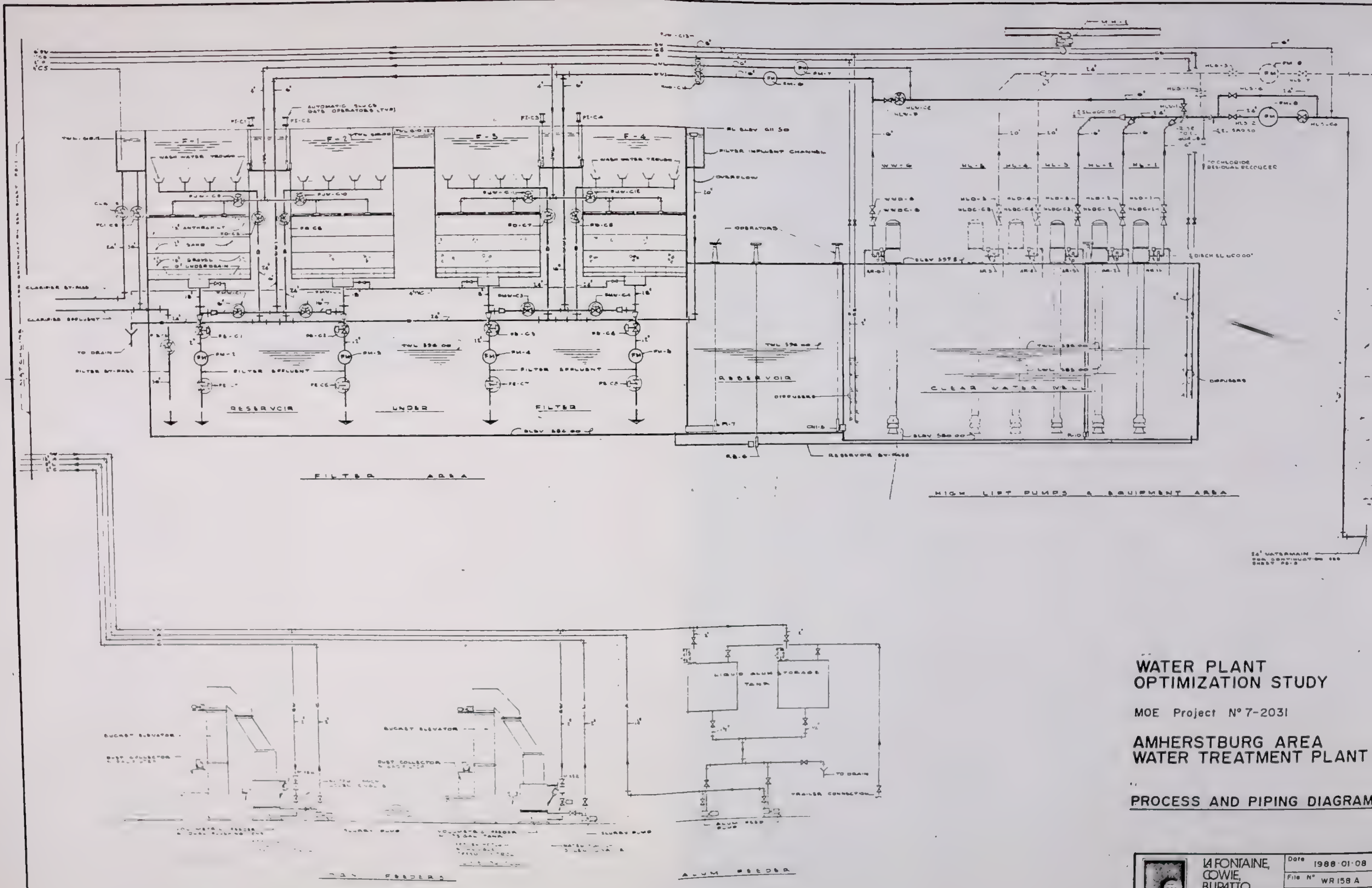

WATER PLANT OPTIMIZATION STUDY

MOE Project N° 7-2031

AMHERSTBURG AREA WATER TREATMENT PLANT

PROCESS AND PIPING DIAGRAM

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LIMITED
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Date	1988-01-08
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APPENDIX B

Daily Summary Sheet
Sampling Program Protocol
Procedures for Shift Operators
Example of Daily Operational Log

AMHERSTBURG AREA WATER SYSTEM DAILY SUMMARY

DATE ____________________ LOW LIFT FLOW ____________________ IG
DAY ____________________ HIGH LIFT FLOW ____________________ IG

TIME	TOWER LEVEL	PLANT PRESS	RES. LEVEL	NO. 1 FILT.	LOSS OF HEAD	NO. 2 FILT.	LOSS OF HEAD	NO. 3 FILT.	LOSS OF HEAD	NO. 4 FILT.	LOSS OF HEAD	INCOMING ALARMS
SHIFT: 00:00 - 08:00			OPERATOR:							SCD READING:		
00:30												
01:00												
01:30												
02:00												
02:30												
03:00												
03:30												
04:00												
04:30												
05:00												
05:30												
06:00												
06:30												
07:00												
07:30												
08:00												
SHIFT: 08:00 - 16:00			OPERATOR:							SCD READING:		
08:30												
09:00												
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15:00												
15:30												
16:00												
SHIFT: 16:00 - 24:00			OPERATOR:							SCD READING:		
16:30												
17:00												
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23:30												
24:00												

TURBIDITY	00:00	04:00	08:00	12:00	16:00	20:00
PLANT EFF.						
FILT. EFF.						
CLAR. EFF.						
RAW WATER						

LOW LIFT PUMP # ____________________
HIGH LIFT PUMP # ____________________

RAW WATER TEMP. ____________ C
PLANT EFF. TEMP. ____________ C

CL2 RESIDUAL						
PLANT EFF. FREE						
FILT. EFF. FREE						
PLANT EFF. TOTAL	☒		☒		☒	

BLOWDOWN

TIME	MINUTES

FLUORIDE RESIDUAL						

REMARKS:

CLARIFIER SLUDGE	00:00	06:00	12:00	18:00
U.C.				
U.D.T.				
L.C.				

MINISTRY
OF THE
ENVIRONMENT

AMHERSTBURG AREA WATER SYSTEM, WATER AND SEWAGE SAMPLING PROGRAM

TYPE OF SAMPLE	FREQUECY OF SAMPLING	HOURS SPENT SAMPLING
GREAT LAKES PROJ, #10 GORD HOPKINS SHIP TO TORONTO	EVERY MONDAY	1.25
PHTOPLANKTON SAMPLE GORD HOPKINS SHIP TO TORONTO	EVERY MONDAY	.75
BACTERIA SAMPLES SHIP TO LONDON	EVERY MONDAY	3.00
BACTERIA SAMPLES SEND TO WINDSOR	EVERY TUESDAY	4.00
THE FOLLOWING ARE MONTHLY SAMPLES, IN ADDITION TO THE WEEKLY SAMPLES		
CHLORINATED ORGANICS: SHIP TO TORONTO	FIRST MONDAY OF EVERY MONTH	0.75
HEAVY METALS: SHIP TO TORONTO	FIRST MONDAY OF EVERY MONTH	0.75
CHEMICAL SAMPLE: SHIP TO LONDON	FIRST MONDAY OF EVERY MONTH	0.75
EDGEWATER BEACH LAGOON SAMPLES SHIP TO LONDON	FIRST MONDAY OF EVERY MONTH	1.50 TWO PEOPLE
SAMPLES ARE ALSO TAKEN EVERY TWO DAYS DURING DISCHARGE TO THE DETROIT RIVER FROM SEWAGE LAGOONS	MONDAY, WEDNESDAY, AND FRIDAYS	1.50 TWO PEOPLE
CHEMICAL SAMPLE: SHIP TO LONDON	ONCE EVERY YEAR FIRST WEEK OF FEBRUARY	1.00

ORRECT PROCEDURES FOR SHIFT OPERATORS; AMHERSTBURG AREA WATER SYSTEM.

THE FOLLOWING GUIDELINES ARE FOR MAKING ROUNDS .

ROUNDS WILL BE MADE AT START, MIDDLE AND THE END OF EACH SHIFT.

AREAS

LOW-LIFT.

(A) CHECK SAMPLE PUMP FOR EXCESSIVE HEAT ON MOTOR AND PUMP BODY ALSO CHECK FOR LEAKAGE AND ANY NOISES.

(B) CHECK THE PUMP THAT IS RUNNING FOR EXCESSIVE HEAT, NOISES AND CHECK LEAKAGE OF PACKING GLAND. ALSO CHECK OIL LEVEL IN THE TOP BEARING AREA OF THE MOTOR. CHECK FOR VIBRATION.

(C) CHECK AREA VALVES AND PIPING FOR ANY LEAKAGE.

(D) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

BASEMENT AREA.

(A) CHECK AIR COMPRESSORS FOR ANY ABNORMAL NOISES OR VIBRATIONS. CHECK COOLING WATER FLOW AT DRAIN. ALSO CHECK FOR ANY LEAKAGE OF AIR OR COOLING WATER AROUND COMPRESSOR TANKS.

(B) CHECK AIR DRYERS FOR OPERATION AND LOOK FOR ANY LEAKS ETC.

(C) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

HIGH-LIFT AND PIPE GALLERY AREAS.

(A) CHECK THE PUMP THAT IS RUNNING FOR EXCESSIVE HEAT, NOISES AND VIBRATIONS. CHECK THE OIL LEVEL IN THE TOP BEARING AREA OF THE MOTOR. CHECK THE LEAKAGE OF THE PACKING GLAND AND ADJUST IF NECESSARY.

(B) CHECK AREA VALVES AND PIPING FOR LEAKS.

(C) CHECK AREA HEATING UNITS FOR OPERATION, CHECK BELTS ETC.

(D) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

CORRECT PROCEEDURE GUIDE FOR MAKING ROUNDS CONT'D.

AREA

CHEMICAL STORAGE AND FEED AREAS INCLUDING CHLORINE ROOM.

CHLORINE ROOM.

(A) TURN ON AND CHECK EMERGENCY EXHAUST FAN FOR OPERATION.

(B) CHECK FOR ANY SIGNS OF LEAKAGE OF CHLORINE GAS, LIQUID OR GASEOUS.

(C) CHECK CHLORINE ALARM PANEL FOR POWER LIGHT AND FOR SOLUTION IN TUBE ON THE SIDE OF THE UNIT.

(D) CHECK INJECTOR AREA FOR ANY LEAKAGE AND LISTEN FOR ANY UNUSUAL NOISES IN THE INJECTOR.

(E) ALWAYS CHECK DOORWAYS FOR ANY OBSTRUCTIONS AND KEEP FREE OF SNOW IN THE WINTER MONTHS.

(F) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. ALSO CHECK DOOR FOR "CAUTION" SIGN. RECORD ANY FINDINGS IN THE LOG BOOK.

CHEMICAL FEED AND STORAGE AREAS.

(A) CHECK ALL PUMP ELECTRIC MOTORS FOR EXCESSIVE TEMPERATURE AND BELT TENSION.

(B) CHECK ALL PUMPS AND VALVES INCLUDING PIPING AND TANKS FOR ANY SIGNS OF LEAKAGE.

(C) CHECK CARBON LEVEL INDICATORS AND FILL WHEN NECESSARY. EVERY TIME CARBON FEEDER IS FILLED IT WILL HAVE THE DISCHARGE LINE FLUSHED FOR TEN MINUTES.

(D) CHECK LEVELS OF ALL CHEMICALS IN DAY TANKS AND FILL IF NECESSARY.

(E) CHECK VALVES OF FLUORIDE TANK.

(F) CHECK ALL SAFETY DRAIN PLUGS IN THE SEWERS OF THE CHEMICAL FEED AND STORAGE ROOMS TO MAKE SURE THEY ARE IN PLACE AND SECURE.

(G) CHECK THE AREA FOR EXCESSIVE DUST OR ANY OILY RAGS ETC. THAT COULD CAUSE FIRES.

(H) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

GARAGE AREA.

(A) CHECK ANY ELECTRIC HEATING UNITS FOR OPERATION IN THE WINTER MONTHS.

(B) CHECK FLUORIDE STORAGE AREA FOR ANY LEAKAGE.

(C) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

CORRECT PROCEEDURE GUIDE FOR MAKING ROUNDS CONT'D.

FILTER AND CLARIFIER AREAS.

(A) CHECK CLARIFIER PIT FOR TEMPERATURE AND FLOODING.

(B) CHECK RECIRCULATOR AND SCRAPPER DRIVES FOR OPERATION.

(C) CHECK ELECTRICAL MOTORS FOR EXCESSIVE HEAT AND CHECK BELTS.

(D) LISTEN FOR ANY UNUSUAL NOISES AND VIBRATIONS.

(E) CHECK HEAT LAMPS IN THE COLD MONTHS AND REPLACE IF POSSIBLE.

(F) KEEP SNOW CLEAR ON THE WALKWAY TO THE CLARIFIER AND THE DECK.

(G) CHECK FILTER AREA FOR AIR LEAKS ON SLUICE GATES ETC.

(H) BEFORE LEAVING AREA CHECK FOR ANY SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ALL FINDINGS IN LOG BOOK.

ALUM STORAGE AREA.

(A) CHECK FOR ANY LEAKAGE FROM VALVES AND TANKS.

(B) CHECK OPERATION OF THE AREA HEATERS, BELTS ETC.

(C) CHECK TO MAKE SURE ROOF HATCH IS CLOSED.

CONTROL AREA AND OFFICE

(A) VISUALLY CHECK ALL PANEL EQUIPMENT AND LABORATORY INSTRUMENTS. AND RECORD ANY DEFECTS IN THE LOG BOOK.

(B) CHECK COMPLETE AREA FOR SAFETY HAZARDS AND CORRECT IF POSSIBLE. RECORD ANY FINDINGS IN LOG BOOK.

(C) CHECK ALARM TAPE FOR ANY OUTSTANDING ALARMS.

SHIFT DUTIES FOR OPERATORS.

AFTERNOON SHIFT:

(A) FIRST MONDAY OF EACH MONTH:
FLUSH ALUM DISCHARGE LINE.
WEIGH AND INSPECT ALL FIRE EXTINGUISHERS IN BUILDING AND IN ALL VEHICLES. RECORD ON TAGS AND IN LOG BOOK.
INSPECT ALL BREATHING EQUIPMENT (SCOTT AND BIO-MARINE)

(B) ON THE LAST DAY OF YOUR AFTERNOON SHIFT THE OPERATOR WILL WASH ALL VEHICLES AND CHECK OVER FOR ALL ENGINE FLUIDS AND ADD IF NECESSARY. CLEAN THE VEHICLE INSIDE, INCLUDING WINDOWS. ANY PROBLEMS WILL BE RECORDED IN LOG BOOK.

DAILY DUTIES FOR AFTERNOONS.

(C) THE OPERATOR IS RESPONSIBLE FOR THE SECURITY OF THE PLANT AND THE PLANT SITE.
THE DOORS ARE TO BE LOCKED AT FIVE O'CLOCK (SEVENTEEN HUNDRED) THE LOCKS AND SECURITY WILL BE CHECKED ON THE HYDRO SUB-STATION, RESERVOIR, CLARIFIER, POLE BARN, AND ANY VEHICLES THAT ARE LEFT OUTSIDE. THESE CHECKS ARE TO BE DONE EVERY FOUR HOURS WHILE MAKING ROUNDS.

(D) IN THE WINTER MONTHS ANY SNOW BUILD UP AROUND THE HYDRO SUB-STATION WILL BE CONTINUOUSLY REMOVED. IF THE OPERATOR IS UNABLE TO DO THIS THEY WILL TAKE APPROPRIATE ACTION.

(E) RECORD ALL MILEAGE OF THE VEHICLES USED DURING OTHER SHIFTS.

(F) THE TRAVELLING WATER SCREEN WILL BE RUN FROM THE SELECTOR SWITCH LOCATED AT THE SCREEN. PUT SWITCH TO THE HAND POSITION AND LISTEN FOR ANY UNUSUAL NOISES ETC.

MID-NIGHT SHIFT.

(A) DRAIN AIR-COMPRESSORS AND AIR DRYERS.

(B) CHECK UPSTAIRS PLANT EFFLUENT METER READING AND COMPARE WITH THE READING ON THE MAIN METER ON THE PLANT EFFLUENT PIPE IN THE BASEMENT AREA.

(C) DO ALL COMPUTER ENTRIES.

(D) CLEAN OFFICE, LABORATORY, WASHROOMS AND LUNCH ROOMS AND PUT OUT THE GARBAGE ON APPROPRIATE DAYS.

DESIGNATED DUTIES.

OPERATOR ON THE DAY SHIFT ON THE FIRST MONDAY OF EACH MONTH WILL :

TEST RUN THE PLANT DIESEL FOR THIRTY MINUTES AND RECORD.

CHANGE THE LEAD PUMPS, HIGH-LIFT AND LOW-LIFT.

CHANGE THE DUTY AIR-COMPRESSOR AND DRYER.

Ministry
of the
Environment
rio

Daily Operational Log

Tuesday DAY

DATE Dec. 1

IME	WORK CARRIED OUT	OPERATOR	REMARKS	
0000	On duty made rounds	Dj.	HL flow to date.	7,046,320,000
	Drained filter + compressor		L.L. flow to date.	8,208,133,000
	Backwash #1 filter. 120,000 gallons used.		Amt. of alum in tank.	6' 11 3/4"
	Mixed batch of polymer 8184		Amt. of Cl2 on scale.	2096 #
	Cleaned area #5		Amt. of fluoride on scale.	75#
0545	Lucier Estate sewage alarm (Called Ken Mountain)			
0615	" " "		HL flow today.	1,250,000
0800	Made rounds + off duty.	Dj	L.L. flow today.	1,503,000
08:00	On duty Made rounds.	R.C	Amt of alum used today.	2"
	Lowered fluoride pump from 3.0 → 2.8.		Amt. of Cl2 used today.	40#
	Mixed batch of 8184 polymer		Amt. of fluoride used today.	133# - 43.5#
	Took filter #4 out, high head loss			
	Put filter #1 into service			
	Check Sandwich Unit #1, received 10 drums			
	of liquid chlorine			
	Worked on tranny on Pick-Ups			
16:00	Made rounds, Off Duty.	R.C		
16:00	On duty, Made rounds	T.I.B.		
	increased pre Cl2 from 27# to 29#			
	increased fluoride from 2.8# to 3.0#			
	mixed a batch of 8184 polymer			
	ran travelling screen			
	#3 filter had high head loss			
	#3 filter lasted only 24 hrs.			
18:00	backwash #4 filter and used (100,000 gals)			
20:00	put #4 in for #3 filter - now operating			
	filters #1, #2, #4.			
	increased pre Cl2 to 31#			
	increased fluoride pump to 3.2# - raw water turb. high			
21:30	Turned on second alum pump - raw water turb. high			
	Changed alum dosage from 38 ppm to 58 ppm			
	mixed a batch of 8184 polymer			

APPENDIX C

DATA TABLES

Table No.	**Description**
1.0	Flows (1 page)
1.1	Daily Flows (3 pages)
2.0	Particulate Removal Summary (4 pages)
2.1	Particulate Removal Profile - 1984 (12 pages)
2.1	Particulate Removal Profile - 1985 (12 pages)
2.1	Particulate Removal Profile - 1986 (12 pages)
3.0	Disinfection Summary (4 pages)
3.1	Disinfection Profile - 1984 (12 pages)
3.1	Disinfection Profile - 1985 (12 pages)
3.1	Disinfection Profile - 1986 (12 pages)
4.0	T & O Control Alkalinity Adj. & Fluoridation Summary (3 pages)
4.1	T & O Control Alkalinity Adj. & Fluoridation Profile - 1984 (12 pages)
4.1	T & O Control Alkalinity Adj. & Fluoridation Profile - 1985 (12 pages)
4.1	T & O Control Alkalinity Adj. & Fluoridation Profile - 1986 (12 pages)
5.0	WPOS Water Quality (4-year Summary) (17 pages)
6.0	Algae Count (3 pages)
7.0	Bacteriological Testing (3 pages)
8.0	Alert Levels (Distribution System) (1 page)
8.1	Alert Levels (Treated Water at Plant) (1 page)
9	DWSP Results

TABLE 1.0: FLOWS (ML/d)

		1986			1985			1984			1983		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JAN	R	8.6	5.7	7.0	7.7	5.5	6.4	7.3	5.0	5.9			
	T	7.8	5.7	6.6	6.6	5.4	5.8	5.9	4.9	5.4			
FEB	R	9.2	6.4	7.5	7.6	5.3	6.0	7.2	5.3	6.2			
	T	8.1	6.4	7.0	6.3	4.6	5.6	6.3	5.3	5.8			
MAR	R	8.8	6.7	7.4	7.4	5.5	6.7	7.5	5.0	6.0			
	T	8.1	6.1	6.9	6.5	5.3	5.7	5.9	4.0	5.3			
APR	R	8.5	7.0	7.5	7.8	6.3	7.1	6.8	4.4	6.0			
	T	8.0	6.5	7.0	6.8	5.4	6.1	5.8	4.5	5.3			
MAY	R	10.3	7.0	8.1	10.8	6.8	8.2	8.5	5.5	6.8			
	T	9.7	6.5	7.4	9.8	5.8	7.3	8.0	5.3	6.4			
JUN	R	9.3	7.2	8.5	10.8	5.9	8.7	9.2	6.5	7.6			
	T	8.8	6.7	7.9	9.9	4.9	7.9	8.9	6.3	7.2			
JUL	R	12.1	7.5	9.1	10.7	6.9	8.8	10.3	5.7	8.0			
	T	11.6	7.5	8.6	10.0	6.9	8.1	9.4	5.7	7.7			
AUG	R	9.4	7.5	8.3	10.6	6.3	7.8	8.2	5.6	6.9			
	T	8.6	7.0	7.8	9.9	6.3	7.3	7.6	5.5	6.4			
SEP	R	8.8	6.6	7.5	8.5	6.2	7.3	7.9	6.0	6.5			
	T	8.3	6.0	6.9	7.7	5.6	6.8	6.4	5.3	5.7			
OCT	R	7.5	6.1	6.6	7.8	5.9	6.8	7.0	4.9	5.8			
	T	7.1	5.6	6.1	6.9	5.4	6.3	6.4	4.9	5.3			
NOV	R	6.8	5.4	6.0	7.6	5.8	6.6	6.6	4.8	6.0			
	T	6.3	4.9	5.5	6.5	5.7	6.0	6.1	4.8	5.5			
DEC	R	7.3	4.8	5.9	7.8	5.2	6.6	7.0	5.7	6.5			
	T	6.8	4.3	5.4	6.6	5.1	6.0	6.5	5.5	6.0			

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 1.1: DAILY FLOWS (ML/d) 1984

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		DAY
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	
MON																			6.5	5.8					MON
TUE									6.1	5.5									6.5	5.8					TUE
WED			6.6	5.5					6.9	6.4					7.6	7.6			7.0	6.4					WED
THU			5.5	5.5	6.2	5.3			6.2	6.2					7.9	6.9			5.3	5.2	6.4	5.0			THU
FRI			5.3	5.3	6.0	5.5			7.2	6.5	8.2	7.6			5.7	5.7			6.7	5.1	5.8	5.0			FRI
SAT			6.1	5.8	5.8	5.7			7.5	6.8	6.5	6.4			6.0	6.0	6.4	5.9	6.6	6.0	6.1	5.3	6.4	5.7	SAT
SUN	6.5	5.5	5.9	5.5	6.1	5.7	6.8	5.4	6.2	6.2	6.5	6.5	8.0	8.0	7.1	6.1	7.4	6.3	4.9	4.9	4.8	4.8	5.7	5.6	SUN
MON	5.6	5.5	5.9	5.8	6.4	5.8	6.3	5.5	8.5	7.3	7.5	7.0	9.5	8.7	7.0	7.0	6.0	6.0	6.1	5.5	6.0	5.3	6.3	5.6	MON
TUE	6.7	5.6	6.2	5.7	6.3	5.9	6.1	5.3	7.1	5.9	7.1	6.5	8.7	8.6	6.9	6.9	6.3	5.9	6.1	5.5	5.9	5.2	6.7	6.0	TUE
WED	5.1	5.1	5.7	5.7	5.5	5.5	5.8	4.9	6.0	5.9	6.9	6.6	8.3	8.2	7.0	6.0	7.9	6.4	6.2	5.3	5.2	5.2	6.0	5.7	WED
THU	5.5	5.5	6.4	5.9	6.0	5.4	6.5	5.5	6.9	6.2	7.5	6.9	8.0	7.1	6.2	6.2	6.7	5.9	5.2	5.2	5.4	5.3	6.9	6.2	THU
FRI	6.3	5.1	7.2	5.9	5.9	5.3	6.2	5.2	7.0	6.5	6.9	6.3	6.6	6.6	6.3	6.3	6.3	5.5	6.1	5.3	6.5	5.1	7.0	6.5	FRI
SAT	5.4	5.4	6.7	5.8	5.2	5.2	6.5	5.5	6.9	7.0	8.0	8.0	6.5	6.5	7.5	6.6	7.0	6.0	6.2	5.4	5.4	5.4	6.3	6.2	SAT
SUN	5.1	5.1	5.9	5.8	5.3	4.9	6.0	5.4	7.4	6.9	8.5	7.8	7.8	6.9	5.9	5.9	7.1	5.5	5.2	5.1	5.3	5.4	5.9	5.5	SUN
MON	6.7	5.5	6.3	5.8	5.8	5.3	4.4	5.6	6.8	6.8	9.2	8.5	6.5	6.5	6.6	6.6	6.5	5.7	5.9	5.1	6.0	5.6	6.7	6.1	MON
TUE	5.3	5.2	6.9	6.3	5.1	5.1	6.4	5.4	7.4	7.0	8.6	8.5	7.4	7.4	7.6	6.7	7.3	5.7	5.8	5.0	6.0	5.3	6.0	6.0	TUE
WED	5.7	5.7	5.7	5.7	5.7	5.3	6.4	5.5	7.1	6.6	7.9	7.3	7.7	6.3	6.6	6.6	6.4	5.6	5.1	5.1	5.6	5.6	6.7	6.2	WED
THU	6.5	5.6	6.6	5.7	5.7	5.1	6.3	5.5	7.1	7.4	6.7	6.3	8.0	8.0	7.1	7.0	6.6	5.8	5.6	5.1	5.9	5.2	6.0	5.9	THU
FRI	5.0	5.0	6.3	5.7	5.0	5.0	5.9	5.1	6.7	6.7	6.5	6.5	8.6	8.6	8.2	7.3	6.1	5.3	5.5	5.0	6.5	5.7	6.3	5.8	FRI
SAT	5.5	5.5	6.7	6.2	5.3	4.9	6.0	5.4	7.5	7.1	7.5	7.0	9.5	8.5	6.5	6.5	6.4	5.7	5.6	5.5	5.6	5.6	6.2	6.2	SAT
SUN	6.0	5.0	6.6	6.0	6.7	5.2	5.3	4.9	6.6	6.2	7.1	6.7	7.4	7.4	5.6	5.5	6.4	5.5	5.5	4.9	6.5	5.7	6.6	6.0	SUN
MON	5.6	5.5	6.2	6.2	7.5	5.4	5.8	5.3	7.6	7.2	7.4	7.4	8.4	8.4	7.0	6.0	6.2	5.4	5.9	5.3	6.4	5.6	6.7	6.2	MON
TUE	5.5	5.5	6.2	5.5	6.0	5.0	5.4	5.0	6.2	6.2	7.4	6.8	7.5	6.6	6.0	6.0	6.3	5.5	5.2	5.2	5.8	5.8	6.1	6.1	TUE
WED	6.9	5.6	6.2	5.7	7.5	5.0	6.0	5.0	6.1	5.7	7.7	7.3	6.5	6.5	7.6	6.3	6.5	5.7	5.7	5.4	5.9	5.9	6.2	5.7	WED
THU	5.2	5.2	5.8	5.9	6.5	5.1	6.0	5.2	6.0	5.6	7.7	7.2	7.1	7.1	6.7	6.0	6.7	5.8	6.1	5.0	6.6	6.1	6.5	5.9	THU
FRI	6.2	5.5	6.2	5.5	5.7	5.0	6.6	5.7	5.5	5.5	7.4	6.9	9.1	8.0	7.6	6.2	6.7	5.9	5.1	5.0	5.8	5.7	6.1	6.0	FRI
SAT	6.3	5.4	6.6	5.9	6.2	5.6	5.6	5.5	6.7	6.2	8.0	7.5	8.7	8.6	8.0	6.6	6.7	5.9	6.1	5.4	6.6	6.0	7.0	6.4	SAT
SUN	6.4	5.6	5.7	5.7	6.1	5.2	5.4	4.5	6.7	6.0	6.7	6.6	9.1	9.0	7.9	6.5	6.3	5.5	6.1	5.4	6.4	5.6	6.7	6.1	SUN
MON	5.5	5.5	6.6	5.9	5.4	5.4	6.3	5.4	5.7	5.6	7.2	7.2	10.3	9.1	7.3	6.5	6.6	5.8	5.7	5.2	5.8	5.7	6.4	6.4	MON
TUE	7.3	5.5	6.5	5.8	6.5	5.0	5.5	5.4	6.0	5.3	8.4	7.6	9.4	9.4	7.2	5.8	6.2	5.4	5.9	5.1	6.6	6.0	7.0	5.6	TUE
WED	5.2	5.2	5.6	5.6	5.3	5.3	6.2	5.4	7.0	6.4	7.0	7.0	9.2	9.2	6.9	6.2	6.3	5.4	5.8	5.1	5.9	5.3	6.0	6.0	WED
THU	7.1	5.2			6.4	4.0	6.4	5.8	8.1	6.0	8.9	8.9	8.2	7.5	7.1	5.9	6.5	5.6			5.6	5.5	6.6	6.0	THU
FRI	5.1	5.1			6.0	5.1	5.2	5.1			8.4	7.5	5.7	5.7	6.8	6.1	6.0	5.3			6.3	5.5	7.0	6.4	FRI
SAT	6.4	5.5			6.6	5.7	6.3	5.7			7.6	7.6	7.2	7.2			6.4	5.5					6.6	6.5	SAT
SUN	6.2	4.9					6.1	5.5					6.8	6.8			6.0	5.4					6.9	6.3	SUN
MON	5.6	5.1					5.2	5.1					8.3	7.5									6.8	6.2	MON
TUE	5.9	5.9											8.2	8.2											TUE

TABLE 1.1: DAILY FLOWS (ML/d) 1985

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		DAY
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	
MON							6.9	5.9					8.8	8.0											MON
TUE	6.0	5.9					6.6	5.7					8.1	7.4					7.4	6.3					TUE
WED	7.1	6.2					6.3	5.4	6.8	5.8			8.7	7.8					6.5	6.4					WED
THU	6.5	5.7					7.1	6.0	7.3	6.4			8.9	7.9	8.6	8.5			7.3	6.4					THU
FRI	6.9	6.0	5.5	5.5	6.2	5.5	6.6	5.6	7.8	7.1			8.2	7.3	10.4	9.1			6.5	6.5	6.2	6.2			FRI
SAT	7.7	5.9	6.4	5.9	7.2	5.9	6.6	5.7	7.7	7.0	9.5	8.5	8.2	7.2	9.9	9.9			7.0	6.2	7.5	6.3			SAT
SUN	5.9	5.8	5.5	5.5	5.9	5.9	6.6	5.8	7.9	6.9	9.3	8.3	8.4	7.4	10.6	9.7	7.7	7.0	6.6	6.6	6.0	6.0	7.2	6.0	SUN
MON	7.6	5.7	6.4	5.8	7.1	5.8	6.6	5.7	7.4	6.4	8.4	7.5	10.6	9.6	8.2	8.1	7.3	7.3	7.8	6.9	7.3	6.1	6.3	6.2	MON
TUE	6.4	5.5	6.4	5.8	5.5	5.5	7.0	6.1	7.9	7.1	8.5	7.6	10.1	9.1	8.6	7.7	8.0	7.3	6.2	6.2	6.1	6.0	7.0	5.6	TUE
WED	6.4	5.5	6.3	5.6	6.8	5.4	6.6	5.8	8.0	7.3	9.2	8.2	8.4	7.4	7.4	7.4	7.4	7.4	7.2	6.3	7.6	6.5	5.8	5.8	WED
THU	6.2	5.6	5.6	5.6	6.3	5.7	7.0	5.9	8.2	7.5	9.5	8.7	8.6	7.8	8.9	7.9	8.0	7.3	6.2	6.2	6.0	6.0	7.8	6.3	THU
FRI	6.4	5.7	6.5	5.9	6.2	5.6	7.4	6.1	8.8	8.1	9.8	9.0	10.0	8.9	8.4	8.4	6.9	6.9	6.4	5.4	6.8	5.9	5.9	5.9	FRI
SAT	6.5	5.9	7.6	4.6	6.8	6.5	7.2	6.0	9.6	8.9	10.8	9.9	9.4	9.4	8.9	8.0	8.5	7.7	6.8	6.3	5.9	5.9	7.7	6.3	SAT
SUN	6.3	5.6	6.0	6.0	6.5	5.9	7.1	6.0	8.8	8.1	10.2	9.5	7.5	6.9	7.4	7.4	7.3	7.2	7.0	6.0	7.2	6.1	6.0	6.0	SUN
MON	6.6	6.0	6.6	5.9	7.1	5.7	7.8	6.6	9.0	8.3	10.6	9.9	8.4	7.0	8.8	7.9	7.6	6.9	6.8	6.3	6.0	6.0	7.6	6.2	MON
TUE	6.4	5.8	6.4	5.7	6.2	5.6	7.4	6.1	9.6	8.1	7.5	6.4	6.9	6.9	7.4	7.3	6.6	6.6	7.3	6.3	7.1	5.8	5.2	5.1	TUE
WED	6.2	5.6	5.7	5.7	7.2	5.8	7.1	5.9	7.6	6.9	7.5	6.6	8.1	7.2	7.8	6.9	7.5	6.7	6.3	6.3	7.1	6.1	7.1	5.8	WED
THU	6.6	6.6	5.9	6.3	6.8	5.5	7.3	6.1	7.3	6.6	7.7	6.7	8.3	7.6	6.7	6.6	6.6	6.6	7.3	6.4	6.1	6.1	6.0	6.0	THU
FRI	6.9	6.0	5.3	5.7	6.9	5.5	6.7	5.7	7.5	6.4	8.4	7.2	8.5	7.7	7.5	6.5	7.4	6.5	6.1	6.1	7.4	6.2	7.1	6.0	FRI
SAT	6.4	5.7	5.5	5.5	7.3	5.9	7.7	6.5	7.7	6.7	7.8	6.8	9.4	8.6	6.9	6.9	7.0	7.0	7.2	6.2	5.9	5.9	6.2	6.1	SAT
SUN	6.3	5.5	5.5	5.1	7.1	5.7	7.5	6.5	8.1	7.2	7.6	6.7	8.0	7.2	7.8	6.8	7.4	6.5	6.2	6.1	6.9	5.7	5.9	5.9	SUN
MON	6.6	5.9	6.0	5.5	7.2	5.9	7.7	6.6	8.1	7.4	7.7	6.8	8.7	8.0	6.7	6.7	6.9	6.9	7.2	6.3	5.8	5.7	7.2	6.5	MON
TUE	7.2	6.5	5.9	5.4	7.4	6.0	7.8	6.7	8.1	7.3	5.9	4.9	8.7	7.9	7.8	6.6	7.4	6.7	6.3	6.3	7.1	5.9	6.9	6.0	TUE
WED	5.5	5.5	6.0	5.4	6.9	5.5	6.9	5.7	7.6	6.9	7.0	6.1	9.0	9.0	6.7	6.7	7.0	6.9	7.2	6.3	5.9	5.8	6.6	6.1	WED
THU	6.0	5.4	5.3	5.3	6.7	5.6	7.3	6.4	8.7	7.8	7.6	6.8	10.1	9.4	7.7	6.9	6.9	6.9	6.3	6.3	7.1	6.2	6.7	6.2	THU
FRI	6.5	5.9	5.8	5.3	6.3	5.7	7.8	6.8	9.5	8.5	9.4	8.7	8.1	8.0	6.8	6.8	7.9	7.0	7.6	6.6	5.9	5.9	6.6	6.1	FRI
SAT	5.9	5.9	6.2	5.8	6.8	6.0	7.3	6.3	10.8	9.8	7.6	6.9	9.5	8.7	7.3	6.5	8.1	7.0	6.4	6.4	7.1	6.0	7.2	6.3	SAT
SUN	6.3	5.6	5.6	5.6	6.9	5.6	7.3	6.4	9.4	8.7	8.0	7.3	9.2	9.1	6.3	6.3	7.0	7.0	7.3	6.2	6.0	6.0	6.3	6.3	SUN
MON	6.8	6.0	7.1	5.5	7.0	5.8	7.7	6.2	7.8	7.0	9.3	8.6	10.7	10.0	7.1	6.3	8.0	6.9	6.3	6.3	7.3	6.4	6.8	5.9	MON
TUE	5.6	5.6	6.5	5.7	6.5	5.5	7.2	6.2	7.5	6.8	9.8	9.0	8.9	8.9	6.6	6.6	6.4	6.4	7.5	6.5	6.0	5.9	6.6	6.6	TUE
WED	6.3	5.6	5.7	5.9	6.5	5.5			7.7	7.0	9.3	8.6	8.1	7.3	7.9	7.1	6.4	5.6	5.9	5.9	7.2	6.2	6.1	5.2	WED
THU	6.0	5.6	5.9	5.2	6.2	5.3			7.6	6.6	9.7	8.9			6.2	6.8	6.7	6.2	7.3	6.2	6.1	6.1	6.2	6.1	THU
FRI					6.8	5.9			7.7	6.8	9.8	9.0			7.8	7.1	6.2	6.2			6.9	5.8	6.9	6.0	FRI
SAT					6.7	5.8					9.6	8.8			6.9	6.9	7.3	6.7			6.2	6.1	6.2	6.1	SAT
SUN					7.0	5.5					9.3	8.5					6.8	6.8					6.7	5.8	SUN
MON																	7.9	6.7					6.2	6.1	MON
TUE																							7.1	6.1	TUE

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 1.1: DAILY FLOWS (ML/d) 1986

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC		DAY
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T	
MON																	8.8	8.3					6.3	5.9	MON
TUE							7.4	6.9					8.3	7.8			8.7	8.2					5.8	5.3	TUE
WED	5.9	5.9					7.6	7.0					8.3	7.8			8.7	8.2	7.5	7.1			5.6	5.1	WED
THU	7.0	6.1					7.0	6.5	7.0	6.5			9.0	8.5			6.9	6.1	6.8	6.3			5.6	5.0	THU
FRI	5.9	5.9					7.4	6.9	7.5	7.0			9.3	8.7	9.4	8.5	7.7	7.1	6.8	6.3			5.5	5.0	FRI
SAT	7.3	6.3	7.1	7.1	8.0	7.1	7.3	6.8	7.8	7.3			10.6	10.1	8.6	8.0	8.1	7.4	7.2	6.7	6.6	6.0	5.6	5.1	SAT
SUN	5.7	5.7	7.7	6.8	7.2	7.2	7.4	6.9	7.5	7.0	9.1	8.6	10.6	10.1	8.0	7.6	7.4	6.0	7.1	6.6	6.4	5.9	5.5	5.0	SUN
MON	7.4	6.4	7.2	7.1	8.0	7.0	8.0	7.5	8.2	7.7	8.3	7.7	12.1	11.6	9.1	8.6	8.2	7.6	7.2	6.7	6.4	5.8	5.7	5.1	MON
TUE	6.0	6.0	7.6	6.6	6.7	6.6	7.1	6.6	7.7	7.2	8.5	8.0	9.4	9.0	8.7	8.2	8.0	7.5	6.7	6.2	5.9	5.4	5.4	4.8	TUE
WED	6.8	5.8	6.9	6.9	7.9	6.2	7.1	6.6	7.7	7.2	9.1	8.5	8.1	7.6	8.4	8.0	7.7	7.3	6.4	5.9	5.9	5.4	5.4	4.8	WED
THU	6.6	6.6	7.8	6.7	6.9	6.9	7.3	6.8	8.3	7.4	7.9	7.4	9.2	8.8	7.6	7.1	7.8	7.4	6.3	5.8	6.0	5.6	6.0	5.5	THU
FRI	7.2	6.2	6.7	6.7	6.9	6.4	7.0	6.5	7.6	7.2	7.7	7.1	7.5	7.5	7.9	7.5	7.2	6.6	6.3	5.9	6.2	5.8	7.0	6.5	FRI
SAT	6.7	6.6	8.0	6.8	7.3	6.8	7.8	7.3	8.6	7.1	8.4	7.8	8.3	7.8	8.7	8.2	7.9	7.4	6.3	6.1	6.4	6.0	7.1	6.6	SAT
SUN	7.4	6.5	6.7	6.6	7.0	6.5	7.4	7.0	8.6	8.0	8.2	7.8	8.2	7.7	8.0	7.6	6.6	6.1	6.6	5.7	6.4	5.9	7.0	6.5	SUN
MON	6.7	6.6	8.1	6.9	7.4	6.9	7.9	7.5	8.2	7.7	8.7	8.2	8.4	7.9	8.6	8.6	7.5	7.0	6.3	6.1	6.4	5.9	7.3	6.8	MON
TUE	7.1	6.3	6.8	6.8	6.9	6.4	7.1	6.6	8.6	8.1	8.2	7.7	9.1	8.6	7.8	7.8	7.8	7.3	6.8	6.1	5.9	5.5	6.8	6.3	TUE
WED	6.2	6.2	8.7	7.3	6.7	6.2	7.2	6.7	8.0	7.5	7.9	7.5	8.3	7.7	7.9	7.3	7.4	7.0	6.6	5.6	6.2	5.7	6.3	5.8	WED
THU	7.1	6.3	8.7	7.6	6.9	6.2	7.4	6.8	8.0	7.4	7.2	6.7	8.8	8.3	7.9	7.4	6.7	6.2	6.1	5.8	5.4	5.3	5.7	5.2	THU
FRI	7.1	7.0	7.6	7.6	7.0	6.4	7.5	6.9	8.1	7.6	8.1	7.6	10.4	9.9	8.0	7.6	6.8	6.3	6.3	5.9	6.0	5.3	5.3	4.7	FRI
SAT	8.6	7.8	9.2	8.1	7.6	6.9	8.2	7.7	8.4	7.8	9.1	8.5	9.7	9.2	8.4	8.0	7.5	7.0	6.4	6.1	6.1	5.1	5.6	5.1	SAT
SUN	6.3	6.3	7.3	7.2	8.8	8.1	7.1	6.5	7.3	6.7	8.0	7.5	9.4	8.9	7.8	7.3	7.0	6.5	6.6	5.9	5.7	4.9	5.8	5.1	SUN
MON	7.6	6.7	8.6	7.5	8.6	7.9	7.8	7.2	7.6	7.0	8.6	8.1	9.4	8.9	8.7	8.2	6.9	6.5	6.5	6.1	5.9	5.4	5.6	5.1	MON
TUE	6.6	6.1	7.1	7.1	6.8	6.1	7.9	6.8	7.1	6.6	8.4	7.9	9.5	9.0	8.3	7.8	6.8	6.3	6.6	6.0	5.6	5.1	6.1	5.6	TUE
WED	7.0	6.7	8.4	7.3	7.4	6.7	7.1	6.6	7.1	6.6	8.2	7.7	9.8	9.3	8.5	8.0	6.8	6.3	6.4	6.1	5.8	5.3	5.7	5.2	WED
THU	7.5	6.7	6.8	6.8	7.1	6.6	7.5	6.9	7.7	7.0	8.1	7.5	9.5	9.0	8.7	8.0	6.9	6.4	6.5	5.9	5.4	5.0	4.8	4.3	THU
FRI	7.1	7.1	7.4	6.5	7.5	7.0	7.6	7.0	7.5	6.9	8.3	7.8	8.6	8.1	8.7	8.2	6.7	6.2	6.4	5.7	5.7	5.2	5.5	5.0	FRI
SAT	8.1	7.2	6.8	6.8	7.6	7.0	8.4	7.8	8.7	8.1	8.5	8.1	8.5	8.0	8.7	8.2	7.3	6.8	6.2	6.1	5.8	5.3	5.4	4.9	SAT
SUN	7.2	7.2	7.4	6.5	7.6	7.0	7.3	6.8	8.6	7.9	8.8	8.3	8.4	7.9	8.8	8.3	6.8	6.3	6.6	5.9	5.4	4.9	5.4	5.0	SUN
MON	8.2	7.7	6.7	6.6	7.8	7.2	8.5	8.0	8.6	7.8	9.3	8.8	8.8	8.3	8.4	7.9	7.5	7.1	6.4	6.5	6.0	5.5	5.6	5.1	MON
TUE	7.9	7.4	7.7	6.8	7.2	6.6	7.9	7.3	7.6	6.9	8.0	7.6	8.3	7.8	7.9	7.4	7.8	7.3	7.0	5.6	6.0	5.5	5.4	4.9	TUE
WED	7.5	6.7	6.4	6.4	7.5	6.8	7.7	7.1	8.6	7.6	9.0	8.6	9.3	8.8	7.7	7.2			6.2	5.6	6.2	5.7	7.1	6.7	WED
THU	7.2	7.2	8.0	7.1	7.7	7.0			8.9	8.1	8.5	8.0	8.9	8.8	7.5	7.0			6.4	5.6	6.1	5.6			THU
FRI	7.7	6.7	6.8	6.7	7.8	7.3			8.9	8.2	9.2	8.6			7.5	7.1			6.1	5.6	6.0	5.5			FRI
SAT					7.8	7.3			10.3	9.7	9.2	8.6			8.0	7.6					6.8	6.3			SAT
SUN					7.9	7.4					9.2	8.6			7.8	7.3					6.3	5.8			SUN
MON					7.6	7.1					8.0	7.5													MON
TUE																									TUE

TABLE 2.0: PARTICULATE REMOVAL SUMMARY

				1986			1985			1984			1983		
				MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JAN	Turbidity (FTU)		R	7.40	1.30	3.06	170.50	4.20	33.40	18.60	2.10	7.30			
			T	0.20	0.10	0.12	1.07	0.19	0.31	1.40	0.21	0.36			
	Prime Coagulant	(mg/L)		38.40	12.60	20.90	59.10	9.40	33.47	51.50	14.40	38.30			
	Coagulant Aid	(mg/L)		0.23	0.15	0.19	0.43	0.32	0.37	0.27	0.17	0.21			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.80	7.50	7.66	8.50	7.20	7.71	7.80	7.50	7.70			
			T	7.20	7.00	7.10	7.40	6.80	7.11	7.30	6.90	7.11			
	Temperature	(Deg.C.)	R	1.00	1.00	1.00	2.00	1.00	1.30	2.00	1.00	1.00			
FEB	Turbidity (FTU)		R	35.00	1.80	10.79	128.00	2.00	16.02	67.20	1.80	11.02			
			T	0.21	0.10	0.16	0.91	0.16	0.34	0.38	0.15	0.23			
	Prime Coagulant	(mg/L)		42.50	13.20	29.75	61.90	12.80	24.06	65.90	30.70	42.05			
	Coagulant Aid	(mg/L)		0.20	0.14	0.17	0.46	0.20	0.39	0.42	0.17	0.30			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	8.40	7.60	7.74	7.80	7.40	7.68	7.90	7.40	7.69			
			T	7.20	7.00	7.09	7.30	7.00	7.17	7.30	6.80	7.05			
	Temperature	(Deg.C.)	R	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.50			
MAR	Turbidity (FTU)		R	112.00	2.70	21.66	176.00	9.50	39.29	179.00	8.00	41.71			
			T	0.68	0.10	0.18	0.97	0.19	0.44	2.90	0.14	0.66			
	Prime Coagulant	(mg/L)		70.90	27.10	40.54	88.90	18.50	43.84	79.90	26.30	49.90			
	Coagulant Aid	(mg/L)		0.24	0.15	0.18	0.37	0.15	0.23	0.45	0.30	0.38			
	Metal Res. Al	(mg/L)	R												
	pH		R	8.10	7.50	7.72	7.90	7.40	7.69	8.10	7.80	7.93			
			T	7.10	6.70	6.94	7.30	6.80	7.12	7.30	7.00	7.17			
	Temperature	(Deg.C.)	R	5.00	1.00	1.40	5.00	1.00	2.50	4.00	2.00	3.10			

TABLE 2.0: PARTICULATE REMOVAL SUMMARY

				1986			1985			1984			1983		
				MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
APR	Turbidity (FTU)		R	22.50	6.60	14.20	246.00	6.70	51.72	53.50	8.70	25.03			
			T	0.29	0.10	0.16	0.65	0.10	0.21	0.64	0.19	0.30			
	Prime Coagulant	(mg/L)		55.00	25.30	39.82	72.40	50.10	59.35	48.90	33.80	40.80			
	Coagulant Aid	(mg/L)		0.19	0.15	0.17	0.36	0.13	0.20	0.46	0.18	0.36			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.90	7.70	7.81	8.50	7.80	8.06	8.40	7.20	8.02			
			T	7.20	6.90	7.05	7.30	6.90	7.11	7.40	6.90	7.16			
	Temperature	(Deg.C.)	R	11.00	5.00	7.10	12.00	4.00	6.80	9.00	3.00	6.30			
MAY	Turbidity (FTU)		R	18.30	6.40	9.40	29.00	5.80	12.09	58.50	7.00	20.79			
			T	0.20	0.13	0.16	0.18	0.09	0.12	0.29	0.13	0.20			
	Prime Coagulant	(mg/L)		47.20	11.40	26.48	56.80	37.90	50.80	45.80	8.50	35.81			
	Coagulant Aid	(mg/L)		0.18	0.13	0.03	0.15	0.10	0.12	0.44	0.29	0.36			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	8.00	7.70	7.86	8.20	7.60	7.91	8.50	7.20	8.00			
			T	7.30	7.00	7.08	7.30	6.80	7.09	7.30	6.80	7.07			
	Temperature	(Deg.C.)	R	16.00	10.00	12.80	17.00	12.00	14.50	14.00	8.00	10.90			
JUN	Turbidity (FTU)		R	26.00	7.60	13.72	24.20	8.30	13.81	19.00	8.50	13.32			
			T	0.27	0.16	0.19	0.19	0.11	0.15	0.75	0.14	0.26			
	Prime Coagulant	(mg/L)		46.70	18.50	31.84	54.50	23.30	33.56	38.70	15.80	28.87			
	Coagulant Aid	(mg/L)		0.18	0.14	0.15	0.30	0.10	0.12	0.44	0.00	0.27			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	8.00	7.60	7.81	7.90	7.60	7.75	8.40	7.40	8.10			
			T	7.20	6.80	7.07	7.20	6.80	7.10	7.40	6.90	7.20			
	Temperature	(Deg.C.)	R	19.00	14.00	17.10	20.00	17.00	17.80	21.00	12.00	17.90			

TABLE 2.0: PARTICULATE REMOVAL SUMMARY

				1986			1985			1984			1983		
				MAX.	MIN.	AVC.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JUL	Turbidity	(FTU)	R	16.30	8.90	11.46	12.60	7.70	9.59	21.00	5.10	13.05			
			T	0.25	0.15	0.20	0.21	0.10	0.15	0.40	0.15	0.26			
	Prime Coagulant	(mg/L)		44.90	12.00	28.93	36.30	6.70	24.67	34.70	12.20	19.40			
	Coagulant Aid	(mg/L)		0.17	0.11	0.14	0.15	0.10	0.10						
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.90	7.50	7.72	8.00	7.60	7.79	8.50	8.00	8.29			
			T	7.20	6.80	7.06	7.30	7.00	7.12	7.50	6.80	7.32			
	Temperature	(Deg.C.)	R	24.00	19.00	22.50	24.00	18.00	22.50	24.00	20.00	22.10			
AUG	Turbidity	(FTU)	R	12.00	6.30	9.23	19.10	5.70	8.45	17.00	7.20	10.44			
			T	0.35	0.20	0.24	0.22	0.10	0.14	0.73	0.12	0.34			
	Prime Coagulant	(mg/L)					33.90	15.10	26.39	39.60	9.00	21.93			
	Coagulant Aid	(mg/L)		0.18	0.14	0.16				0.38	0.28	0.32			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.90	7.60	7.75	8.00	7.70	7.85	8.60	7.50	8.23			
			T	7.30	6.80	7.03	7.20	7.00	7.14	7.70	7.20	7.39			
	Temperature	(Deg.C.)	R	25.00	19.00	23.20	24.00	22.00	23.10	24.00	22.00	23.60			
SEP	Turbidity	(FTU)	R	28.00	7.10	11.00	14.80	4.50	8.26	14.00	7.30	10.03			
			T	0.32	0.21	0.26	0.21	0.03	0.12	1.20	0.52	0.72			
	Prime Coagulant	(mg/L)		55.60	10.10	33.72	35.80	23.30	28.58						
	Coagulant Aid	(mg/L)		0.20	0.15	0.18				0.37	0.27	0.34			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.90	7.40	7.69	7.90	7.70	7.80	8.50	7.40	8.10			
			T	7.30	7.00	7.08	7.20	7.00	7.11	7.70	7.30	7.56			
	Temperature	(Deg.C.)	R	20.00	18.00	19.20	22.00	17.00	20.20	23.00	17.00	19.70			

TABLE 2.0: PARTICULATE REMOVAL SUMMARY

				1986			1985			1984			1983		
				MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
OCT	Turbidity (FTU)		R	31.70	8.30	14.10	20.50	3.30	7.15	15.60	5.80	9.07			
			T	0.29	0.09	0.15	0.19	0.02	0.05	0.69	0.18	0.33			
	Prime Coagulant	(mg/L)		67.10	29.80	45.13	41.40	14.80	29.22	57.00	5.10	19.11			
	Coagulant Aid	(mg/L)		0.21	0.17	0.20				0.34	0.23	0.30			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.90	7.40	7.68	7.90	7.60	7.75	8.30	7.50	8.02			
			T	7.80	6.90	7.20	7.20	6.90	7.10	8.60	6.80	7.43			
	Temperature	(Deg.C.)	R	19.00	11.00	14.90	17.00	11.00	14.20	16.00	14.00	14.70			
NOV	Turbidity (FTU)		R	29.00	8.00	14.72	64.00	13.70	30.56	46.80	6.70	19.66			
			T	0.16	0.12	0.14	0.19	0.04	0.08	1.30	0.15	0.30			
	Prime Coagulant	(mg/L)		65.10	39.60	53.60	76.20	24.80	49.98	44.90	9.70	32.48			
	Coagulant Aid	(mg/L)		0.24	0.19	0.22				0.50	0.34	0.40			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.70	7.50	7.60	8.20	7.60	7.86	8.50	7.30	7.83			
			T	7.10	6.80	7.00	7.20	6.70	7.04	7.40	6.80	7.25			
	Temperature	(Deg.C.)	R	15.00	3.00	6.60	11.00	6.00	8.60	13.00	3.00	7.10			
DEC	Turbidity (FTU)		R	59.10	6.80	22.29	112.00	3.90	23.13	117.20	6.80	25.13			
			T	0.18	0.06	0.14	0.36	0.11	0.16	0.69	0.15	0.23			
	Prime Coagulant	(mg/L)		70.50	43.50	55.69	85.10	26.70	44.63	54.40	27.40	38.43			
	Coagulant Aid	(mg/L)		0.27	0.18	0.22	0.25	0.17	0.20	0.42	0.32	0.37			
	Metal Res. Al	(mg/L)	R												
			T												
	pH		R	7.70	7.40	7.50	8.00	7.60	7.80	8.20	7.00	7.72			
			T	7.10	6.90	7.01	7.20	7.00	7.07	7.50	6.70	7.08			
	Temperature	(Deg.C.)	R	3.00	1.00	1.60	5.00	1.00	2.00	4.00	1.00	2.50			

TABLE 2.1: PARTICULATE REMOVAL PROFILE JAN 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	14.60	4.10	0.41	0.41	14.40	0.18				7.70	7.30	2.0
2	16.00	4.90	0.50	0.50	34.00	0.21				7.60	7.10	2.0
3	17.00	5.90	0.49	0.53	42.40	0.27				7.60	7.00	2.0
4	16.80	4.40	0.29	0.40	49.00	0.23				7.70	7.20	1.0
5	18.60	3.20	0.25	0.35	46.00	0.22				7.70	7.30	1.0
6	15.20	3.30	0.28	0.33	32.80	0.19				7.60	7.30	1.0
7	11.80	2.90	0.21	0.25	40.70	0.22				7.80	7.20	1.0
8	10.20	2.60	0.24	0.25	48.80	0.23				7.60	7.10	2.0
9	9.60	3.20	0.28	0.29	33.00	0.18				7.80	7.20	1.0
10	7.20	2.40	0.21	0.27	47.80	0.23				7.80	7.20	1.0
11	6.30	2.00	0.20	0.22	43.90	0.20				7.80	7.10	1.0
12	5.90	1.80	0.23	0.22	38.50	0.18				7.50	7.10	1.0
13	5.50	1.70	0.20	0.21	49.60	0.23				7.70	7.00	1.0
14	5.20	1.70	0.22	0.22	45.80	0.21				7.70	7.00	1.0
15	4.90	1.60	0.22	0.21	42.10	0.19				7.80	7.10	1.0
16	5.20	1.50	0.20	0.22	39.50	0.21				7.80	7.00	1.0
17	3.80	12.20	2.40	0.21	28.80	0.21				7.70	7.10	1.0
18	2.50		0.41	0.31	27.40	0.19				7.80	7.20	1.0
19	5.80		0.29	0.34	30.00	0.23				7.70	7.10	1.0
20	3.60		0.31	0.29	40.00	0.19				7.80	7.20	1.0
21	3.30		0.25	0.28	40.00	0.19				7.70	7.10	1.0
22	3.30		0.14	0.25	34.00	0.18				7.80	7.20	1.0
23	10.00		1.04	0.31	51.50	0.22				7.80	7.20	1.0
24	5.30	6.90	0.84	1.40	25.70	0.18				7.70	7.10	1.0
25	3.90	9.00	0.85	0.82	24.00	0.23				7.70	7.10	1.0
26	2.80	12.50	0.40	0.66	26.70	0.17				7.60	7.10	0.5
27	2.40	4.10	0.22	0.44	48.90	0.23				7.60	7.10	0.0
28	2.60	2.30	0.22	0.32	39.20	0.19				7.70	7.00	0.5
29	2.70	2.30	0.24	0.29	40.00	0.19				7.60	6.90	0.5
30	2.30	2.40	0.21	0.25	44.40	0.21				7.80	6.90	0.5
31	2.10	2.00	0.20	0.23	37.50	0.20				7.60	7.00	0.5

TABLE 2.1: PARTICULATE REMOVAL PROFILE FEB 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	1.80	1.70	0.22	0.22	38.10	0.18				7.60	6.80	1.0
2	2.20	1.60	0.22	0.22	45.70	0.22				7.60	6.90	1.0
3	2.10	1.60	0.23	0.23	44.40	0.23				7.60	6.80	1.0
4	2.30	1.40	0.24	0.24	38.50	0.19				7.50	6.80	1.0
5	2.00	1.40	0.22	0.22	42.10	0.22				7.60	6.80	1.0
6	2.10	1.30	0.20	0.20	40.40	0.21				7.70	7.00	1.0
7	2.10		0.27	0.27	39.40	0.19				7.40	7.00	1.0
8	2.20	0.98	0.20	0.25	41.00	0.21				7.50	7.20	1.0
9	2.30	1.20	0.24	0.25	39.00	0.19				7.70	7.20	1.0
10	2.20	1.10	0.25	0.25	30.70	0.17				7.70	7.10	1.0
11	2.70	1.10	0.21	0.25	37.40	0.18				7.50	7.20	1.0
12	12.00	2.40	0.24	0.22	42.70	0.20				7.70	7.30	1.0
13	42.00	6.70	0.43	0.22	55.00	0.38	0.73			7.80	7.30	1.0
14	67.20	10.40	0.38	0.36	54.80	0.35	0.73			7.80	7.30	1.0
15	39.80	9.40	0.22	0.38	65.90	0.42	0.80			7.90	7.00	2.0
16	18.60	3.30	0.15	0.29	57.10	0.41	0.78			7.80	7.20	2.0
17	12.50	3.10	0.31	0.23	39.40	0.37				7.70	7.00	2.0
18	8.50	2.30	0.28	0.23	37.50	0.35				7.80	7.00	2.0
19	11.00	2.80	0.20	0.27	33.20	0.36				7.80	7.00	2.0
20	11.10	2.80	0.20	0.23	40.60	0.38				7.80	7.10	2.0
21	6.40	2.10	0.15	0.21	35.30	0.39				7.70	7.00	2.0
22	5.20	1.80	0.16	0.17	40.20	0.41				7.80	7.10	2.0
23	5.90	1.50	0.13	0.17	37.50	0.42				7.70	7.10	2.0
24	6.20	1.90	0.18	0.15	40.20	0.35				7.80	7.10	2.0
25	7.90	2.70	0.17	0.34	38.30	0.36				7.70	7.10	2.0
26	5.60	1.90	0.14	0.15	43.80	0.38				7.70	7.00	2.0
27	6.80	5.80	0.15	0.16	38.00	0.35				7.70	7.10	2.0
28	16.00	2.50	0.16	0.15	38.60	0.35				7.70	7.00	2.0
29	13.00	2.30	0.16	0.17	44.70	0.42				7.80	6.90	2.0
30												
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE MAR 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.00	1.60	0.17	0.14	33.80	0.37				7.80	7.00	2.0
2	8.00	1.50	0.15	0.15	42.10	0.38				7.80	7.10	2.0
3	19.00	3.70	0.23	0.17	43.80	0.39				7.80	7.10	2.0
4	31.00	8.70	0.31	0.21	46.10	0.37	0.37			7.80	7.20	2.0
5	28.00	5.90	0.33	0.29	59.20	0.35	0.35			7.90	7.20	2.0
6	23.00	4.80	0.53	0.34	59.90	0.36	0.36			8.00	7.20	2.0
7	24.00	4.40	0.27	0.37	79.90	0.41	0.41			8.00	7.30	3.0
8	21.00	3.80	0.24	0.31	26.30	0.38	0.38			8.10	7.30	3.0
9	18.00	3.40	0.18	0.26	42.60	0.38	0.38			8.00	7.20	3.0
10	16.00	2.60	0.15	0.21	45.10	0.43				7.90	7.20	3.0
11	17.00	2.70	0.18	0.19	44.40	0.43				7.90	7.10	3.0
12	15.00	3.40	0.21	0.21	48.90	0.39				7.80	7.20	3.0
13	8.90	2.50	0.21	0.21	42.90	0.44				7.90	7.20	3.0
14	8.80	2.70	0.18	0.19	44.10	0.40				7.90	7.10	3.0
15	8.30	2.40	0.17	0.20	38.70	0.40				7.90	7.10	3.0
16	26.00	3.80	0.16	0.19	56.50	0.45				7.90	7.00	3.0
17	115.00	21.60	0.16	2.30	71.10	0.43	0.43			8.00	7.10	3.0
18	103.00	5.50	3.70	2.10	56.70	0.34	0.34			8.10	7.20	3.0
19	48.00	2.80	2.20	2.90	46.10	0.30	0.30			8.00	7.20	3.0
20	29.00	2.80	1.50	1.80	63.50	0.38	0.38			7.90	7.30	3.0
21	132.00	2.70	0.32	1.05	50.10	0.30	0.30			7.80	7.10	3.0
22	179.00	3.70	0.44	1.20	57.80	0.35	0.35			7.80	7.30	4.0
23	84.00	2.80	1.70	1.70	65.80	0.39	0.39			7.90	7.20	4.0
24	72.00	1.80	1.60	1.30	60.20	0.36	0.36			8.00	7.20	4.0
25	51.00	3.30	0.26	0.63	61.40	0.37	0.37			7.90	7.10	4.0
26	39.00	3.80	0.27	0.43	46.70	0.42	0.42			7.90	7.10	4.0
27	23.00	3.20	0.24	0.35	38.20	0.34	0.34			8.00	7.30	4.0
28	19.00	2.80	0.38	0.30	47.40	0.43	0.43			8.10	7.20	4.0
29	28.00	2.60	0.23	0.24	44.00	0.35	0.35			8.00	7.20	4.0
30	45.00	6.20	0.33	0.28	41.70	0.34	0.36			7.90	7.10	4.0
31	45.00	7.10	0.39	0.32	42.00	0.33	0.37			8.00	7.20	4.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE APR 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	36.00	8.70	0.39	0.38	34.70	0.35				8.00	7.10	4.0
2	21.00	5.00	0.34	0.34	40.30	0.36				7.90	7.00	4.0
3	19.00	4.80	0.32	0.35	41.00	0.37				8.00	7.10	4.0
4	29.00	5.10	0.31	0.32	43.50	0.42				8.10	7.20	3.0
5	30.00	6.00	0.29	0.31	33.80	0.37				8.20	7.10	4.0
6	33.00	5.50	0.31	0.29	40.40	0.38	0.39			8.10	7.10	3.0
7	27.00	5.30	0.31	0.32	38.40	0.37	0.40			7.90	7.10	3.0
8	17.00	3.00	0.30	0.31	41.70	0.40	0.39			7.90	7.10	3.0
9	16.00	5.10	0.25	0.28	34.10	0.37	0.40			8.20	6.90	4.0
10	25.00	5.30	0.29	0.26	39.20	0.37	0.35			8.00	7.20	6.0
11	53.00	6.60	0.29	0.29	39.20	0.37	0.37			8.00	7.10	6.0
12	53.50	9.30	0.33	0.33	39.80	0.38	0.35			7.60	7.10	6.0
13	44.50	11.60	0.33	0.33	42.50	0.40	0.38			7.90	7.30	7.0
14	45.50	8.30	0.34	0.34	37.20	0.40	0.35			7.70	7.20	8.0
15	35.00	7.20	0.26	0.26	47.30	0.45	0.36			7.20	6.90	8.0
16	27.00	5.60	0.29	0.29	37.50	0.41	0.41			7.60	7.20	9.0
17	22.00	4.30	0.19	0.28	39.20	0.44	0.42			7.50	7.20	8.0
18	16.80	3.30	0.21	0.25	37.00	0.40	0.44			7.90	7.30	7.0
19	13.60	2.30	0.20	0.24	41.50	0.20	0.43			8.10	7.20	7.0
20	10.60	1.80	0.20	0.20	38.30	0.18	0.47			8.10	7.30	7.0
21	10.00	1.70	0.19	0.19	45.20	0.22	0.43			8.30	7.30	7.0
22	8.70	4.00	0.19	0.21	47.00	0.22	0.45			8.40	7.30	7.0
23	13.50	1.80	0.18	0.20	35.00	0.19	0.39			8.30	7.40	7.0
24	25.00	2.80	0.20	0.20	46.20	0.44	0.38			8.30	7.30	7.0
25	29.00	3.80	0.23	0.21	40.90	0.39				8.20	7.30	7.0
26	21.60	3.50	0.38	0.56	39.50	0.37				8.40	7.40	8.0
27	14.10	2.10	0.27	0.64	48.70	0.46				8.40	7.10	8.0
28	14.10	1.90	0.19	0.40	45.10	0.38				7.80	7.10	8.0
29	14.60	2.10	0.20	0.30	41.00	0.39				8.10	7.00	9.0
30	25.70	3.40	0.21	0.25	48.90	0.46				8.40	7.00	9.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE MAY 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	58.50	4.60	0.22	0.26	41.00	0.39				8.50	7.00	9.0
2	32.10	2.60	0.23	0.26	31.30	0.42				8.40	7.20	9.0
3	25.80	2.30	0.26	0.23	40.00	0.38				8.20	7.20	9.0
4	26.00	2.50	0.22	0.21	35.50	0.36				8.20	7.10	9.0
5	41.00	3.20	0.16	0.26	33.40	0.35				8.20	7.20	9.0
6	42.00	3.60	0.27	0.29	31.30	0.39				8.30	7.20	9.0
7	31.00	5.80	0.24	0.13	38.00	0.35				8.10	7.10	9.0
8	30.00	2.70	0.25	0.24	41.90	0.38				8.10	7.10	9.0
9	25.50	2.60	0.18	0.19	36.30	0.40				8.00	7.20	9.0
10	15.00	2.60	0.18	0.18	35.50	0.35				8.10	7.10	8.0
11	13.00	1.70	0.20	0.19	30.80	0.34				8.10	7.10	8.0
12	7.00	1.90	0.16	0.18	8.50	0.34				8.10	7.10	8.0
13	12.00	1.50	0.16	0.17	36.70	0.33				8.10	7.00	9.0
14	14.00	1.90	0.19	0.17	33.90	0.35				7.90	7.00	9.0
15	18.00	2.10	0.17	0.19	35.80	0.32				7.90	7.10	10.0
16	18.30	2.30	0.20	0.20	33.80	0.34				8.10	7.10	10.0
17	20.40	2.30	0.20	0.20	37.60	0.32				8.00	7.10	11.0
18	18.00	2.40	0.18	0.18	35.20	0.36				7.70	6.90	11.0
19	16.50	1.70	0.19	0.19	40.40	0.32				7.70	6.90	13.0
20	12.50	1.20	0.18	0.18	25.00	0.36				7.50	6.90	13.0
21	10.00	1.20	0.25	0.21	40.50	0.32				7.60	6.80	13.0
22	16.00	1.04	0.21	0.21	41.10	0.39				7.20	6.90	13.0
23	13.30	1.45	0.19	0.21	41.50	0.39				7.80	6.80	13.0
24	11.10	1.30	0.18	0.18	45.80	0.40				8.00	7.00	14.0
25	11.40	1.03	0.16	0.16	37.40	0.44				7.90	7.10	14.0
26	15.30	1.38	0.18	0.15	37.40	0.36				7.90	7.00	14.0
27	13.00	1.50	0.15	0.15	39.00	0.36				8.00	7.10	14.0
28	10.40	1.40	0.15	0.16	42.10	0.43				8.30	7.20	14.0
29	19.20	2.60	0.19	0.17	41.20	0.40				8.20	7.30	13.0
30	27.30	2.70	0.21	0.20	31.20	0.34				7.60	7.20	13.0
31	21.00	4.50	0.21	0.20	30.90	0.29				8.20	7.20	13.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUN 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	14.70	2.80	0.21	0.19	30.70	0.29				8.10	7.00	14.0
2	10.10	2.40	0.18	0.17	36.30	0.34				8.00	7.10	14.0
3	13.10	1.90	0.16	0.18	38.70	0.37				8.30	7.20	14.0
4	12.60	1.70	0.17	0.19	29.30	0.32				8.10	7.30	15.0
5	9.00	1.30	0.22	0.21	31.00	0.33				8.40	7.30	15.0
6	8.50	1.30	0.25	0.23	37.80	0.34				8.30	7.40	15.0
7	9.90	1.20	0.27	0.26	33.50	0.39				8.20	7.40	12.0
8	13.00	1.50	0.22	0.23	36.50	0.36				8.30	7.40	16.0
9	11.50	1.00	0.21	0.14	23.60	0.42				8.40	7.30	16.0
10	11.20	1.10	0.24	0.23	29.60	0.44				8.30	7.40	16.0
11	11.80	1.30	0.25	0.23	27.30	0.40				8.30	7.40	16.0
12	10.00	1.20	0.19	0.19	29.40	0.39				8.40	7.30	16.0
13	10.00	1.40	0.24	0.22	31.70	0.33				8.00	7.20	20.0
14	12.00	1.30	0.24	0.20	37.20	0.35				8.00	7.20	20.0
15	12.00	1.10	0.24	0.41	38.40	0.37				7.90	7.20	19.0
16	14.00	1.10	0.24	0.27	33.30	0.32				8.10	7.20	19.0
17	16.00	1.50	0.21	0.23	35.10	0.33				8.10	7.10	20.0
18	16.00	1.30	0.25	0.30	33.80	0.32				8.10	7.20	21.0
19	14.00	0.84	0.23	0.24	33.80	0.32				8.20	7.20	20.0
20	12.00	0.94	0.25	0.25	32.50	0.31				8.20	7.40	20.0
21	12.70	1.70	0.26	0.26	32.80	0.31				8.20	6.90	20.0
22	13.90	1.80	0.16	0.16	18.20	0.31				8.20	6.90	20.0
23	10.70	1.10	0.75	0.75	15.80	0.35				7.60	6.90	20.0
24	17.00	2.00	0.37	0.37	19.00	0.18				7.60	6.90	20.0
25	19.00	1.50	0.33	0.33	27.00	0.00				7.40	7.20	20.0
26	16.00	1.90	0.32	0.32	18.70	0.00				8.00	6.90	20.0
27	17.80	2.30	0.26	0.30	18.00	0.00				8.00	7.10	20.0
28	16.80	1.90	0.25	0.28	17.70	0.00				8.10	7.30	20.0
29	16.50	1.70	0.33	0.30	18.70	0.00				8.00	7.20	20.0
30	17.80	1.90	0.30	0.30	20.70	0.00				8.30	7.40	20.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUL 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	21.00	2.00	0.30	0.31	15.80	N / A				8.30	7.40	20.0
2	16.80	1.80	0.41	0.32	16.80					8.30	7.30	21.0
3	17.30	2.10	0.41	0.40	18.20					8.40	7.30	22.0
4	15.80	1.80	0.35	0.38	15.20					8.00	7.40	22.0
5	16.00	1.80	0.40	0.38	15.70					8.30	7.10	22.0
6	16.00	1.20	0.31	0.33	28.50					8.20	7.30	22.0
7	16.80	1.90	0.23	0.28	19.30					8.40	7.40	21.0
8	16.30	1.80	0.28	0.27	20.00					8.40	7.30	21.0
9	15.00	1.50	0.27	0.28	19.30					8.00	7.30	21.0
10	14.80	1.40	0.22	0.25	21.20					8.40	7.40	21.0
11	12.80	0.92	0.24	0.25	34.70					8.20	7.30	21.0
12	15.10	1.20	0.26	0.26	27.40					8.40	7.40	21.0
13	11.30	1.30	0.27	0.27	14.60					8.40	7.40	21.0
14	14.00	1.10	0.32	0.26	16.60					8.20	7.30	21.0
15	14.10	1.20	0.27	0.30	17.00					8.40	7.40	21.0
16	12.20	1.40	0.26	0.30	18.60					8.20	7.30	21.0
17	14.10	1.80	0.27	0.26	25.00					8.40	7.40	21.0
18	15.00	1.70	0.29	0.27	19.20					8.40	7.50	21.0
19	10.00	1.20	0.22	0.23	17.70					8.30	7.40	22.0
20	11.00	2.90	0.27	0.24	13.70					8.30	7.40	22.0
21	13.00	1.30	0.25	0.27	21.80					8.30	7.40	22.0
22	12.00	1.70	0.20	0.25	13.90					8.40	7.40	22.0
23	11.00	2.20	0.26	0.26	12.20					8.40	7.40	23.0
24	10.00	1.40	0.18	0.19	20.00					8.40	7.40	24.0
25	5.10	0.98	0.16	0.16	17.10					8.20	7.00	24.0
26	9.40	1.40	0.15	0.15	15.30					8.20	7.40	24.0
27	9.90	1.30	0.18	0.18	27.50					8.30	7.40	24.0
28	11.20	1.02	0.19	0.19	26.10					8.50	7.40	24.0
29	9.70	0.98	0.19	0.19	18.60					8.10	7.30	24.0
30	9.40	1.40	0.22	0.22	15.10					8.20	6.80	24.0
31	8.60	1.30	0.27	0.24	19.20					8.20	7.00	24.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE   AUG 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	8.80	1.50	0.23	0.25	16.50					8.10	7.30	24.0
2	9.20	1.70	0.24	0.25	19.90					8.00	7.40	24.0
3	8.00	1.20	0.22	0.24	27.40					8.00	7.30	24.0
4	8.40	1.40	0.20	0.23	26.40					7.90	7.30	24.0
5	9.40	1.50	0.23	0.20	22.30					8.00	7.40	24.0
6	8.00	0.90	0.31	0.30	18.10					8.10	7.50	24.0
7	9.80	1.10	0.30	0.28	18.30					8.30	7.50	24.0
8	8.90	1.70	0.31	0.28	22.60					8.20	7.30	24.0
9	8.40	1.00	0.22	0.23	25.20					8.30	7.40	24.0
10	10.20	0.77	0.20	0.20	19.90					8.00	7.40	24.0
11	9.30	0.78	0.21	0.21	20.90					8.00	7.20	24.0
12	12.70	0.79	0.19	0.20	26.50					8.00	7.20	24.0
13	11.60	0.75	0.18	0.19	23.70					8.20	7.30	24.0
14	8.10	0.69	0.19	0.17	16.60					8.50	7.40	24.0
15	7.40	1.20	0.21	0.20	28.40					8.40	7.30	24.0
16	8.20	0.88	0.23	0.24	17.80					8.40	7.30	24.0
17	7.20	0.89	0.21	0.19	15.20					8.20	7.20	24.0
18	7.80	2.80	0.28	0.27	24.30					8.00	7.20	24.0
19	9.90	4.30	0.24	0.23	39.60					8.20	7.30	24.0
20	16.00	3.50	0.13	0.46	9.00		0.33			8.40	7.40	24.0
21	17.00	*	0.21	0.14			0.38			8.40	7.40	24.0
22	14.00	*	0.76	0.12			0.29			8.40	7.40	22.0
23	12.00	*	0.45	0.56			0.33			8.40	7.40	22.0
24	13.00	*	0.61	0.65			0.29			8.40	7.40	22.0
25	14.00	*	0.75	0.61			0.28			8.60	7.40	23.0
26	14.00	*	0.74	0.66			0.28			8.50	7.70	23.0
27	10.00	*	0.53	0.51			0.30			8.60	7.70	23.0
28	12.00	*	0.89	0.73			0.31			8.50	7.60	23.0
29	8.30	*	0.69	0.69			0.32			8.00	7.40	23.0
30	12.00	*	0.62	0.62			0.31			8.60	7.70	23.0
31	10.00	*	0.61	0.45			0.36			7.50	7.30	23.0

* Clarifier out of service for repairs - direct filtration

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE SEP 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	11.40	*	0.54	0.54		0.34	0.34			7.40	7.60	23.0
2	11.40	*	0.66	0.66		0.30	0.30			8.50	7.40	23.0
3	11.20	*	0.66	0.66		0.27	0.27			7.90	7.30	23.0
4	14.00	*	0.68	0.68		0.35	0.35			7.80	7.30	22.0
5	13.20	*	0.68	0.69		0.28	0.28			8.10	7.40	21.0
6	11.40	*	0.60	0.64		0.33	0.33			8.00	7.50	21.0
7	12.20	*	0.82	0.76		0.35	0.35			8.10	7.40	20.0
8	11.50	*	0.72	0.75		0.31	0.31			8.10	7.50	20.0
9	10.30	*	0.83	0.79		0.31	0.31			8.30	7.60	20.0
10	9.80	*	0.75	0.76		0.34	0.34			8.10	7.50	20.0
11	9.30	*	0.79	0.72		0.30	0.30			8.00	7.40	20.0
12	9.10	*	0.70	0.75		0.34	0.34			8.10	7.60	20.0
13	8.40	*	0.67	0.70		0.34	0.34			8.00	7.50	20.0
14	8.00	*	0.67	0.62		0.37	0.37			8.00	7.60	20.0
15	9.50	*	0.51	0.59		0.35	0.35			8.20	7.70	20.0
16	12.90	*	0.56	0.56		0.35	0.35			8.10	7.50	20.0
17	8.00	*	0.51	0.52		0.36	0.36			8.00	7.50	19.0
18	9.20	*	0.59	0.55		0.35	0.35			8.20	7.60	19.0
19	8.70	*	0.52	0.55		0.34	0.34			8.10	7.70	19.0
20	8.60	*	0.65	0.59		0.33	0.33			8.20	7.60	19.0
21	8.00	*	1.10	0.73		0.33	0.33			8.10	7.60	19.0
22	7.40	*	0.74	0.88		0.33	0.33			8.10	7.70	19.0
23	7.90	*	0.94	0.77		0.35	0.35			8.20	7.70	19.0
24	7.30	*	0.84	0.94		0.32	0.32			8.10	7.60	19.0
25	8.90	*	1.90	0.89		0.37	0.37			8.00	7.60	19.0
26	14.00	*	1.30	1.20		0.35	0.35			8.20	7.70	18.0
27	9.60	*	0.50	1.10		0.34	0.34			8.40	7.60	17.0
28	9.10	*	0.56	0.75		0.37	0.37			8.50	7.70	17.0
29	9.90	*	0.48	0.67		0.35	0.35			8.20	7.70	17.0
30	10.60	*	0.50	0.58		0.36	0.36			8.10	7.70	17.0
31												

* Clarifier out of service for repairs - direct filtration

TABLE 2.1: PARTICULATE REMOVAL PROFILE OCT 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	10.90	*	0.43	0.50			2.20			8.10	7.70	16.0
2	12.10	*	0.50	0.51			2.20			8.10	7.50	15.0
3	13.20	*	0.58	0.58			2.20			8.10	8.60	15.0
4	12.00	*	0.61	0.61			2.20			8.10	7.80	15.0
5	10.10	6.50	0.65	0.65	57.00					8.10	7.80	15.0
6	7.30	1.50	0.67	0.67	38.00					7.50	6.80	15.0
7	15.30	1.30	0.65	0.64	12.80					7.60	6.80	15.0
8	15.60	0.99	0.69	0.69	15.50					8.00	7.30	15.0
9	9.20	1.50	0.44	0.44	20.70					8.10	7.20	158.0
10	7.70	1.10	0.36	0.32	15.20					8.10	7.40	15.0
11	7.00	1.30	0.24	0.30	24.10					8.10	7.40	15.0
12	6.30	1.00	0.28	0.28	20.60					8.10	7.40	15.0
13	6.20	1.10	0.26	0.22	20.40					8.20	7.40	15.0
14	6.70	1.20	0.22	0.22	18.20					8.20	7.50	15.0
15	5.80	1.00	0.20	0.23	15.90					8.10	7.60	15.0
16	6.50	0.98	0.28	0.23	21.60					8.30	7.50	15.0
17	6.70	0.93	0.22	0.19	24.50					7.60	7.40	15.0
18	6.70	1.00	0.16	0.18	16.80					8.20	7.50	15.0
19	10.10	3.30	0.20	0.18	17.10					8.30	7.30	15.0
20	10.50	1.60	0.20	0.21	17.00	0.40				8.10	7.30	15.0
21	9.30	1.80	0.25	0.21	16.10	0.41				7.80	7.40	15.0
22	14.30	1.90	0.26	0.24	18.00	0.38				7.90	7.40	15.0
23	8.50	1.40	0.15	0.18	18.20	0.43				8.00	7.40	14.0
24	8.10	1.90	0.17	0.19	16.50	0.39				8.10	7.30	14.0
25	7.10	1.60	0.20	0.19	11.10	0.41				8.00	7.30	14.0
26	7.80	1.50	0.17	0.19	5.10	0.39				7.90	7.40	14.0
27	6.70	1.20	0.21	0.21	10.30	0.40				8.00	7.40	14.0
28	8.40	1.90	0.25	0.18	10.30	0.40				7.90	7.40	14.0
29	6.50	1.50	0.31	0.24	11.90	0.38				8.00	7.30	14.0
30	8.20	1.70	0.56	0.28	10.70	0.39				8.00	7.40	14.0
31	10.30	1.20	0.36	0.21	32.30	0.41				8.00	7.40	14.0

* Clarifier out of service for repairs - direct filtration

TABLE 2.1: PARTICULATE REMOVAL PROFILE SEP 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	11.40	*	0.54	0.54		0.34	0.34			7.40	7.60	23.0
2	11.40	*	0.66	0.66		0.30	0.30			8.50	7.40	23.0
3	11.20	*	0.66	0.66		0.27	0.27			7.90	7.30	23.0
4	14.00	*	0.68	0.68		0.35	0.35			7.80	7.30	22.0
5	13.20	*	0.68	0.69		0.28	0.28			8.10	7.40	21.0
6	11.40	*	0.60	0.64		0.33	0.33			8.00	7.50	21.0
7	12.20	*	0.82	0.76		0.35	0.35			8.10	7.40	20.0
8	11.50	*	0.72	0.75		0.31	0.31			8.10	7.50	20.0
9	10.30	*	0.83	0.79		0.31	0.31			8.30	7.60	20.0
10	9.80	*	0.75	0.76		0.34	0.34			8.10	7.50	20.0
11	9.30	*	0.79	0.72		0.30	0.30			8.00	7.40	20.0
12	9.10	*	0.70	0.75		0.34	0.34			8.10	7.60	20.0
13	8.40	*	0.67	0.70		0.34	0.34			8.00	7.50	20.0
14	8.00	*	0.67	0.62		0.37	0.37			8.00	7.60	20.0
15	9.50	*	0.51	0.59		0.35	0.35			8.20	7.70	20.0
16	12.90	*	0.56	0.56		0.35	0.35			8.10	7.50	20.0
17	8.00	*	0.51	0.52		0.36	0.36			8.00	7.50	19.0
18	9.20	*	0.59	0.55		0.35	0.35			8.20	7.60	19.0
19	8.70	*	0.52	0.55		0.34	0.34			8.10	7.70	19.0
20	8.60	*	0.65	0.59		0.33	0.33			8.20	7.60	19.0
21	8.00	*	1.10	0.73		0.33	0.33			8.10	7.60	19.0
22	7.40	*	0.74	0.88		0.33	0.33			8.10	7.70	19.0
23	7.90	*	0.94	0.77		0.35	0.35			8.20	7.70	19.0
24	7.30	*	0.84	0.94		0.32	0.32			8.10	7.60	19.0
25	8.90	*	1.90	0.89		0.37	0.37			8.00	7.60	19.0
26	14.00	*	1.30	1.20		0.35	0.35			8.20	7.70	18.0
27	9.60	*	0.50	1.10		0.34	0.34			8.40	7.60	17.0
28	9.10	*	0.56	0.75		0.37	0.37			8.50	7.70	17.0
29	9.90	*	0.48	0.67		0.35	0.35			8.20	7.70	17.0
30	10.60	*	0.50	0.58		0.36	0.36			8.10	7.70	17.0
31												

* Clarifier out of service for repairs - direct filtration

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE OCT 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	10.90	*	0.43	0.50			2.20			8.10	7.70	16.0
2	12.10	*	0.50	0.51			2.20			8.10	7.50	15.0
3	13.20	*	0.58	0.58			2.20			8.10	8.60	15.0
4	12.00	*	0.61	0.61			2.20			8.10	7.80	15.0
5	10.10	6.50	0.65	0.65	57.00					8.10	7.80	15.0
6	7.30	1.50	0.67	0.67	38.00					7.50	6.80	15.0
7	15.30	1.30	0.65	0.64	12.80					7.60	6.80	15.0
8	15.60	0.99	0.69	0.69	15.50					8.00	7.30	15.0
9	9.20	1.50	0.44	0.44	20.70					8.10	7.20	158.0
10	7.70	1.10	0.36	0.32	15.20					8.10	7.40	15.0
11	7.00	1.30	0.24	0.30	24.10					8.10	7.40	15.0
12	6.30	1.00	0.28	0.28	20.60					8.10	7.40	15.0
13	6.20	1.10	0.26	0.22	20.40					8.20	7.40	15.0
14	6.70	1.20	0.22	0.22	18.20					8.20	7.50	15.0
15	5.80	1.00	0.20	0.23	15.90					8.10	7.60	15.0
16	6.50	0.98	0.28	0.23	21.60					8.30	7.50	15.0
17	6.70	0.93	0.22	0.19	24.50					7.60	7.40	15.0
18	6.70	1.00	0.16	0.18	16.80					8.20	7.50	15.0
19	10.10	3.30	0.20	0.18	17.10					8.30	7.30	15.0
20	10.50	1.60	0.20	0.21	17.00	0.40				8.10	7.30	15.0
21	9.30	1.80	0.25	0.21	16.10	0.41				7.80	7.40	15.0
22	14.30	1.90	0.26	0.24	18.00	0.38				7.90	7.40	15.0
23	8.50	1.40	0.15	0.18	18.20	0.43				8.00	7.40	14.0
24	8.10	1.90	0.17	0.19	16.50	0.39				8.10	7.30	14.0
25	7.10	1.60	0.20	0.19	11.10	0.41				8.00	7.30	14.0
26	7.80	1.50	0.17	0.19	5.10	0.39				7.90	7.40	14.0
27	6.70	1.20	0.21	0.21	10.30	0.40				8.00	7.40	14.0
28	8.40	1.90	0.25	0.18	10.30	0.40				7.90	7.40	14.0
29	6.50	1.50	0.31	0.24	11.90	0.38				8.00	7.30	14.0
30	8.20	1.70	0.56	0.28	10.70	0.39				8.00	7.40	14.0
31	10.30	1.20	0.36	0.21	32.30	0.41				8.00	7.40	14.0

* Clarifier out of service for repairs - direct filtration

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE NOV 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	16.90	4.40	1.14	1.30	19.60	0.37	0.34			8.00	7.20	13.0
2	26.00	5.30	0.71	1.30	37.80	0.41				8.50	7.40	11.0
3	8.80	1.60	0.21	0.55	30.90	0.39				8.30	7.30	11.0
4	13.80	0.89	0.18	0.36	19.50	0.50				8.20	7.40	11.0
5	15.00	1.50	0.18	0.28	15.60	0.40				8.20	7.20	11.0
6	14.20	1.60	0.23	0.26	15.90	0.41				8.00	7.10	10.0
7	6.70	1.10	0.24	0.24	18.00	0.43				8.00	7.40	10.0
8	16.00	1.80	0.20	0.20	23.40	0.45				7.40	6.80	10.0
9	12.40	2.70	0.23	0.23	9.70	0.37				8.00	7.40	10.0
10	11.80	2.30	0.22	0.22	17.40	0.44				7.60	7.20	10.0
11	18.00	2.70	0.21	0.21	36.60	0.45				7.90	7.40	10.0
12	27.00	2.50	0.29	0.29	36.20	0.40				8.00	7.40	9.0
13	23.30	2.60	0.22	0.22	42.10	0.40				8.00	7.30	8.0
14	30.50	1.80	0.22	0.22	44.70	0.43				7.60	7.30	8.0
15	40.50	2.00	0.24	0.24	42.60	0.41				7.30	7.10	7.0
16	46.80	4.70	0.24	0.27	34.00	0.37	0.39			7.40	7.20	7.0
17	23.20	2.50	0.22	0.22	44.90	0.43				7.50	7.20	6.0
18	18.20	1.70	0.21	0.23	33.80	0.37				7.60	7.20	6.0
19	16.80	1.30	0.18	0.19	39.60	0.38				7.70	7.20	6.0
20	22.80	1.10	0.14	0.20	37.80	0.41				7.70	7.30	5.0
21	23.30	1.30	0.18	0.17	37.20	0.38				7.60	7.20	4.0
22	23.10	1.50	0.18	0.19	38.30	0.34				8.30	7.40	4.0
23	27.00	1.80	0.17	0.19	43.70	0.39				7.70	7.30	4.0
24	19.00	1.30	0.18	0.18	37.90	0.34				7.60	7.20	4.0
25	17.10	1.10	0.17	0.18	34.30	0.35				7.70	7.20	4.0
26	13.50	1.20	0.14	0.16	38.00	0.39				7.80	7.20	3.0
27	13.00	2.30	0.12	0.15	38.00	0.34				7.90	7.20	3.0
28	18.30	2.10	0.18	0.16	32.20	0.42				7.80	7.20	3.0
29	15.30	1.90	0.16	0.19	39.50	0.43				7.70	7.30	3.0
30	11.40	1.30	0.15	0.16	35.10	0.43				7.90	7.30	3.0
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TABLE 2.1: PARTICULATE REMOVAL PROFILE DEC 1984

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	11.20	1.20	0.18	0.17	39.30	0.38				7.80	7.20	3.0
2	7.00	0.86	0.16	0.18	44.20	0.42				7.90	7.30	3.0
3	13.60	1.60	0.17	0.16	29.90	0.38				7.80	7.20	3.0
4	15.50	1.70	0.17	0.20	37.70	0.35				7.80	7.20	3.0
5	12.50	1.10	0.15	0.16	43.50	0.42				7.70	7.00	3.0
6	9.50	0.97	0.15	0.15	31.80	0.35				7.70	7.10	2.0
7	14.60	1.20	0.15	0.16	36.10	0.35				7.60	7.00	2.0
8	22.20	1.40	0.17	0.18	34.80	0.38				7.80	7.10	2.0
9	16.70	1.60	0.19	0.18	42.30	0.40				7.80	7.00	2.0
10	14.50	1.50	0.19	0.21	32.70	0.36				7.70	7.10	2.0
11	16.00	1.40	0.19	0.19	41.70	0.40				7.80	7.00	2.0
12	17.00	1.50	0.21	0.21	37.60	0.36				7.20	6.70	2.0
13	15.00	1.40	0.24	0.24	31.70	0.40				7.00	6.80	2.0
14	15.00	1.40	0.22	0.22	40.00	0.41				7.40	6.70	3.0
15	18.00	1.50	0.18	0.18	40.30	0.38				7.60	7.00	3.0
16	17.00	1.90	0.17	0.17	38.30	0.37				7.50	6.70	3.0
17	20.00	2.30	0.20	0.20	37.40	0.36				7.70	7.00	4.0
18	14.00	1.20	0.16	0.16	41.30	0.39				7.60	6.70	4.0
19	11.80	1.30	0.18	0.17	30.50	0.39				7.80	7.00	4.0
20	14.50	2.40	0.19	0.21	38.60	0.37				7.60	7.00	4.0
21	6.80	1.30	0.15	0.17	41.40	0.40				7.60	7.10	3.0
22	71.20	4.60	0.38	0.41	35.90	0.34	0.38			7.70	7.20	3.0
23	117.20	25.50	0.52	0.69	51.70	0.36	0.36			7.80	7.30	3.0
24	81.60	16.70	0.22	0.46	54.40	0.38	0.33			7.70	7.10	2.0
25	51.70	9.90	0.27	0.33	45.30	0.35				7.70	7.00	1.0
26	28.10	4.70	0.19	0.24	36.70	0.37				7.80	7.20	1.0
27	15.50	2.00	0.25	0.22	37.90	0.34				7.90	7.30	1.0
28	20.80	2.00	0.22	0.25	35.60	0.32				8.10	7.40	1.0
29	37.80	4.40	0.23	0.26	38.30	0.34				8.20	7.30	2.0
30	31.30	4.40	0.31	0.26	27.40	0.33				7.80	7.50	2.0
31	21.30	3.30	0.23	0.25	36.90	0.33				8.10	7.40	2.0

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE JAN 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	101.20	7.60	0.20	0.20	48.10	0.38	0.38			8.50	7.30	2.0
2	170.50	35.00	0.86	0.34	37.60	0.32	0.33			8.40	7.40	2.0
3	169.30	51.00	2.20	1.07	48.10	0.36	0.36			8.10	7.20	2.0
4	58.00	15.00	0.24	0.76	36.20	0.35	0.34			8.00	7.30	2.0
5	35.00	1.18	0.28	0.49	32.60	0.33	0.31			7.90	7.30	2.0
6	43.00	7.90	0.18	0.31	42.80	0.38	0.38			7.80	7.20	2.0
7	47.00	1.06	0.25	0.34	33.30	0.32	0.34			7.90	7.30	2.0
8	47.00	1.60	0.37	0.31	39.30	0.37	0.35			7.80	7.20	2.0
9	28.20	8.00	0.26	0.28	59.10	0.38	0.36			7.70	7.10	2.0
10	25.20	5.60	0.16	0.20	40.50	0.39	0.41			7.80	7.20	1.0
11	34.80	5.50	0.18	0.23	39.50	0.38	0.36			7.80	7.10	1.0
12	23.80	4.50	0.20	0.23	33.90	0.37	0.35			7.80	7.10	1.0
13	27.30	4.10	0.19	0.24	39.70	0.38	0.36			7.80	7.10	1.0
14	32.00	4.00	0.21	0.28	28.70	0.37	0.35			7.80	7.00	1.0
15	38.20	5.60	0.27	0.25	39.50	0.38	0.36			7.70	7.00	1.0
16	25.00	5.70	0.27	0.27	40.60	0.39	0.41			7.50	6.80	1.0
17	15.70	2.60	0.26	0.26	38.10	0.37	0.41			7.50	7.00	1.0
18	18.20	3.80	0.24	0.24	32.10	0.35	0.20			7.60	7.10	1.0
19	15.50	2.70	0.22	0.22	36.70	0.37				7.20	7.00	1.0
20	11.30	2.50	0.22	0.22	28.40	0.38				7.50	7.00	1.0
21	9.60	2.40	0.19	0.19	9.40	0.36				7.50	7.00	1.0
22	9.40	2.70	0.25	0.25	35.00	0.33				7.60	7.00	1.0
23	8.30	2.60	0.24	0.22	45.40	0.43				7.60	7.00	1.0
24	6.60	3.10	0.40	0.32	26.40	0.40				7.50	7.10	1.0
25	6.60	3.80	0.33	0.39	38.50	0.37				7.50	7.00	1.0
26	6.00	3.40	0.23	0.30	21.50	0.41				7.40	7.00	1.0
27	5.30	3.10	0.35	0.29	15.10	0.38				7.50	7.10	1.0
28	4.40	2.30	0.21	0.29	13.90	0.35				7.50	7.20	1.0
29	4.50	2.60	0.22	0.27	16.80	0.43				7.60	7.20	1.0
30	4.20	3.10	0.30	0.25	20.00	0.36				7.50	7.10	1.0
31	4.20	2.60	0.24	0.24	20.80	0.37				7.70	7.10	1.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE FEB 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	3.80	2.00	0.19	0.22	17.20	0.43				7.80	7.20	1.0
2	3.40	2.00	0.22	0.22	14.90	0.37				7.80	7.30	1.0
3	3.20	1.90	0.18	0.21	23.00	0.43				7.70	7.20	1.0
4	3.40	2.10	0.21	0.22	14.90	0.37				7.40	7.10	1.0
5	3.50	2.90	0.21	0.18	20.00	0.37				7.80	7.20	1.0
6	3.10	2.00	0.75	0.91	20.00	0.38				7.70	7.30	1.0
7	3.10	1.70	0.30	0.66	22.30	0.38				7.80	7.20	1.0
8	2.70	1.70	0.24	0.45	22.20	0.37				7.80	7.20	1.0
9	2.70	1.50	0.21	0.35	12.80	0.33				7.70	7.20	1.0
10	2.50	1.40	0.20	0.26	15.70	0.37				7.70	7.30	1.0
11	2.60	1.30	0.18	0.22	14.30	0.35				7.80	7.20	1.0
12	2.70	1.40	0.20	0.20	14.80	0.36				7.70	7.20	1.0
13	2.60	1.30	0.20	0.21	21.90	0.42				7.70	7.20	1.0
14	2.50	1.30	0.16	0.18	14.90	0.38				7.70	7.20	1.0
15	2.40	1.20	0.17	0.18	16.50	0.42				7.70	7.20	1.0
16	2.20	1.20	0.18	0.21	22.80	0.44				7.70	7.20	1.0
17	2.20	1.20	0.16	0.19	17.00	0.43				7.70	7.20	1.0
18	2.00	1.00	0.14	0.16	15.70	0.40				7.80	7.20	1.0
19	2.30	1.00	0.16	0.18	21.40	0.41				7.70	7.20	1.0
20	2.20	1.10	0.18	0.18	36.80	0.40				7.70	7.20	1.0
21	2.30	1.30	0.18	0.18	23.90	0.46				7.80	7.20	1.0
22	2.50	1.80	0.21	0.21	21.80	0.42				7.80	7.20	1.0
23	10.20	1.70	0.21	0.21	20.20	0.39				7.40	7.10	1.0
24	128.00	15.10	0.52	0.52	61.90	0.43	0.21			7.50	7.00	1.0
25	126.00	3.20	0.91	0.91	53.60	0.34	0.41			7.50	7.10	1.0
26	59.60	13.30	0.78	0.78	53.00	0.37	0.40			7.50	7.00	1.0
27	40.70	7.10	0.24	0.53	44.30	0.42	0.40			7.50	7.00	1.0
28	24.20	20.00	0.51	0.61	16.00	0.20	0.76			7.60	7.00	1.0
29												
30												
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE MAR 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	20.50	16.40	0.36	0.72	20.30	0.19	0.73			7.50	7.10	1.0
2	16.50	11.80	0.35	0.49	35.00	0.18	0.63			7.60	7.20	1.0
3	9.50	8.00	1.00	0.97	48.00	0.20	0.76			7.50	7.20	1.0
4	14.70	7.90	0.29	0.87	39.70	0.17	0.68			7.50	6.90	1.0
5	29.70	13.90	0.78	0.64	46.20	0.22	0.83			7.50	6.90	1.0
6	28.50	15.00	0.47	0.62	23.30	0.17	0.67			7.90	7.20	1.0
7	27.30	18.00	0.45	0.57	19.90	0.19	0.71			7.80	7.30	1.0
8	25.20	9.40	0.22	0.44	30.40	0.19	0.73			7.40	7.20	2.0
9	25.10	9.40	0.30	0.35	18.50	0.17	0.67			7.80	7.30	2.0
10	21.90	8.30	0.32	0.34	24.10	0.18	0.69			7.60	7.10	2.0
11	19.80	6.60	0.25	0.33	22.20	0.16	0.64			7.70	7.20	2.0
12	60.60	12.60	0.35	0.31	40.40	0.19	0.72			7.90	7.30	2.0
13	26.20	10.30	0.21	0.38	35.00	0.15	0.76			7.80	7.20	2.0
14	22.10	13.40	0.21	0.27	32.30	0.22	0.83			7.70	7.30	2.0
15	18.20	6.90	0.18	0.20	31.90	0.21	0.83			7.80	7.20	2.0
16	24.00	1.30	0.16	0.19	34.60	0.15	0.77			7.70	7.20	2.0
17	38.00	1.40	0.23	0.25	31.00	0.18	0.72			7.80	7.30	2.0
18	30.00	18.00	0.53	0.35	34.80	0.15	0.75			7.70	7.20	2.0
19	44.00	1.40	0.52	0.59	38.80	0.16	0.74			7.80	7.00	2.0
20	49.30	16.70	0.93	0.65	50.10	0.17	0.82			7.70	6.90	3.0
21	46.80	7.50	0.50	0.84	88.90	0.18	0.67			7.60	6.90	3.0
22	44.80	5.10	0.23	0.55	69.60	0.19				7.60	6.90	3.0
23	38.70	3.80	0.20	0.39	65.10	0.36				7.60	6.90	3.0
24	27.30	2.80	0.24	0.31	64.10	0.35				7.70	6.80	3.0
25	27.20	2.60	0.21	0.28	62.70	0.34				7.60	6.90	3.0
26	29.20	1.40	0.21	0.23	77.60	0.37				7.70	6.90	4.0
27	22.70	1.60	0.18	0.23	52.20	0.35				7.80	7.20	4.0
28	31.20	1.30	0.26	0.27	60.00	0.37				7.80	7.20	4.0
29	114.00	1.90	0.28	0.30	53.00	0.33				7.80	7.20	5.0
30	176.00	4.20	0.35	0.29	54.60	0.34				7.70	7.30	5.0
31	109.00	10.70	0.26	0.28	54.60	0.26				7.80	7.30	5.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE APR 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	246.00	12.30	0.94	0.53	60.20	0.29	0.05			8.00	7.10	4.0
2	155.00	5.70	0.44	0.65	57.70	0.28	0.11			8.00	7.20	4.0
3	88.00	8.40	0.17	0.43	69.80	0.36	0.22			8.10	7.20	5.0
4	36.00	4.90	0.16	0.32	66.20	0.32	0.20			8.20	7.10	5.0
5	36.00	3.70	0.13	0.23	72.20	0.35	0.22			8.10	7.10	5.0
6	101.00	12.70	0.16	0.22	57.20	0.35	0.25			8.10	7.10	6.0
7	62.00	11.10	0.16	0.30	66.60	0.35	0.24			8.00	7.20	5.0
8	55.00	8.50	0.16	0.22	72.20	0.35	0.22			8.20	7.10	5.0
9	51.00	6.90	0.13	0.21	72.40	0.35	0.20			8.40	7.00	5.0
10	86.50	13.50	0.15	0.18	62.10	0.15	0.07			8.50	7.00	5.0
11	75.00	13.20	0.14	0.17	54.10	0.14	0.06			8.40	7.10	5.0
12	60.00	7.30	0.13	0.15	59.90	0.14	0.06			8.20	7.20	5.0
13	50.00	6.50	0.16	0.17	57.20	0.14	0.06			8.00	7.10	6.0
14	50.00	7.30	0.15	0.24	57.90	0.14	0.06			8.10	7.20	6.0
15	43.00	5.20	0.16	0.25	52.50	0.13	0.05			8.00	7.30	6.0
16	36.80	3.30	0.11	0.14	54.80	0.13	0.06			7.90	7.00	6.0
17	40.00	2.30	0.24	0.15	58.00	0.14	0.06			7.90	7.10	5.0
18	60.00	2.30	0.14	0.14	52.00	0.13	0.05			8.00	7.20	6.0
19	50.00	1.80	0.15	0.15	64.90	0.15	0.05			8.10	7.30	6.0
20	30.00	1.40	0.17	0.19	57.40	0.16	0.06			8.00	7.20	6.0
21	20.00	1.20	0.15	0.17	50.10	0.16	0.06			8.00	7.30	6.0
22	14.00	0.97	0.13	0.14	57.20	0.16	0.06			8.10	7.30	6.0
23	12.00	0.78	0.14	0.17	58.20	0.16	0.06			8.00	7.20	6.0
24	8.10	0.70	0.12	0.14	63.80	0.15	0.06			7.90	6.90	11.0
25	9.60	0.72	0.11	0.13	55.90	0.14	0.14			7.90	7.00	11.0
26	6.70	0.70	0.11	0.13	52.40	0.13	0.12			8.00	6.90	11.0
27	7.40	0.63	0.09	0.10	51.70	0.14	0.13			7.90	6.90	11.0
28	19.20	0.88	0.09	0.12	55.70	0.14	0.13			7.80	6.90	12.0
29	21.20	1.10	0.11	0.11	53.10	0.13	0.12			7.90	7.00	12.0
30	22.20	1.10	0.14	0.17	57.10	0.14	0.13			8.20	7.00	12.0
31												

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE MAY 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	23.00	0.95	0.15	0.17	55.70	0.15	0.04			8.00	7.20	12.0
2	24.00	1.20	0.15	0.18	52.20	0.14	0.04			7.90	7.30	12.0
3	26.00	1.10	0.16	0.15	52.30	0.13	0.04			8.10	7.20	13.0
4	29.00	1.20	0.14	0.13	53.00	0.13	0.05			8.00	7.20	13.0
5	23.00	0.95	0.14	0.15	51.60	0.13	0.04			8.10	7.10	13.0
6	17.00	1.00	0.12	0.12	55.00	0.14	0.05			8.20	7.20	13.0
7	12.00	0.88	0.10	0.11	51.80	0.13	0.04			7.90	7.10	13.0
8	8.40	0.70	0.09	0.11	51.20	0.13	0.04			7.90	7.00	13.0
9	8.60	0.90	0.10	0.11	50.10	0.13	0.04			7.80	7.10	13.0
10	8.90	0.69	0.10	0.12	46.40	0.12	0.04			7.80	7.10	14.0
11	6.90	0.73	0.10	0.10	42.70	0.11	0.04			7.80	7.20	15.0
12	5.80	0.51	0.10	0.10	46.60	0.12	0.04			7.80	7.20	15.0
13	6.10	0.44	0.10	0.10	45.40	0.11	0.04			7.70	7.20	15.0
14	6.70	0.64	0.11	0.11	42.80	0.11	0.04			8.00	7.30	15.0
15	6.30	0.67	0.11	0.10	54.00	0.13	0.05			7.90	7.00	15.0
16	7.90	0.63	0.11	0.10	55.80	0.14	0.04			8.00	7.10	15.0
17	7.60	0.69	0.12	0.11	54.80	0.13	0.04			8.00	7.10	15.0
18	10.90	0.70	0.12	0.11	49.10	0.13	0.04			7.90	7.00	15.0
19	12.80	0.90	0.10	0.10	50.70	0.12	0.04			7.90	7.10	15.0
20	15.00	0.88	0.11	0.11	50.20	0.12	0.04			7.90	7.00	15.0
21	9.70	0.60	0.10	0.10	50.80	0.12	0.04			7.90	7.10	15.0
22	6.90	0.50	0.12	0.12	53.80	0.12	0.04			8.00	7.00	15.0
23	7.50	0.74	0.13	0.11	46.80	0.11	0.04			7.90	7.10	15.0
24	8.10	0.90	0.11	0.10	46.40	0.10	0.04			8.00	7.10	15.0
25	7.90	0.67	0.12	0.12	37.90	0.11	0.04			8.00	7.10	15.0
26	8.10	0.56	0.14	0.13	53.40	0.11	0.04			7.90	7.00	15.0
27	7.70	0.53	0.14	0.14	52.50	0.12	0.04			7.90	7.00	15.0
28	7.90	0.53	0.14	0.15	54.50	0.12	0.04			8.00	7.10	15.0
29	13.30	0.78	0.13	0.13	56.80	0.13	0.05			7.80	6.90	16.0
30	11.70	0.61	0.10	0.09	53.70	0.14	0.05			7.70	6.90	16.0
31	20.00	2.70	0.10	0.10	56.80	0.13	0.05			7.60	6.80	17.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUN 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	24.20	1.70	0.13	0.13	46.40	0.11	0.04			7.80	6.90	17.0
2	13.70	0.58	0.11	0.12	40.60	0.11	0.04			7.70	6.80	17.0
3	15.00	0.76	0.13	0.13	29.80	0.12	0.04			7.60	6.90	17.0
4	20.80	1.00	0.13	0.14	29.60	0.12	0.04			7.70	6.90	18.0
5	20.10	0.92	0.14	0.15	27.40	0.11	0.04			7.80	7.20	18.0
6	16.80	1.10	0.16	0.16	26.60	0.11	0.04			7.80	7.10	18.0
7	12.00	0.93	0.18	0.16	25.80	0.11	0.04			7.70	7.10	19.0
8	9.60	0.98	0.16	0.16	23.30	0.10	0.03			7.80	7.10	20.0
9	12.50	0.89	0.18	0.17	24.40	0.10	0.03			7.80	7.20	20.0
10	12.60	1.10	0.19	0.19	23.70	0.10	0.03			7.70	7.10	20.0
11	13.50	2.80	0.15	0.16	50.60	0.14	0.06			7.70	7.10	19.0
12	17.50	1.30	0.12	0.15	54.50	0.16	0.05			7.70	7.10	18.0
13	21.30	1.50	0.13	0.15	49.10	0.13	0.05			7.80	7.10	17.0
14	16.30	1.10	0.13	0.14	48.60	0.12	0.04			7.80	7.10	17.0
15	11.80	0.70	0.11	0.12	52.60	0.13	0.05			7.70	7.20	17.0
16	13.20	1.20	0.12	0.13	49.60	0.14	0.05			7.80	7.10	17.0
17	13.50	0.74	0.14	0.14	36.80	0.30	0.05			7.70	7.10	17.0
18	14.20	1.30	0.15	0.16	26.80	0.18	0.06			7.70	7.10	17.0
19	13.00	0.92	0.15	0.17	36.10	0.14	0.05			7.80	7.20	17.0
20	11.50	0.81	0.16	0.18	28.80	0.13	0.04			7.70	7.10	17.0
21	8.30	0.75	0.15	0.17	26.40	0.10	0.03			7.90	7.20	17.0
22	8.60	0.58	0.17	0.15	33.20	0.13	0.04			7.80	7.20	17.0
23	12.30	0.82	0.16	0.15	31.40	0.12	0.03			7.70	7.20	17.0
24	15.40	0.70	0.16	0.14	27.00	0.11	0.03			7.80	7.20	18.0
25	11.50	0.78	0.12	0.13	25.70	0.10	0.03			7.80	7.10	18.0
26	10.80	0.77	0.12	0.13	26.80	0.11	0.03			7.70	7.10	18.0
27	11.10	1.30	0.14	0.11	26.00	0.10	0.04			7.70	7.20	18.0
28	10.30	0.95	0.14	0.15	25.70	0.10	0.04			7.70	7.10	18.0
29	10.00	0.78	0.14	0.15	26.30	0.10	0.04			7.80	7.20	18.0
30	12.80	1.00	0.17	0.16	27.10	0.11	0.03			7.80	7.10	18.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUL 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	12.20	0.76	0.16	0.17	25.10	0.12	0.04			7.80	7.20	18.0
2	10.90	0.67	0.16	0.16	30.90	0.14	0.04			7.70	7.10	18.0
3	10.20	0.54	0.17	0.16	32.30	0.12	0.04			7.70	7.00	21.0
4	8.50	0.48	0.14	0.14	28.30	0.12	0.04			7.70	7.00	21.0
5	8.60	0.56	0.15	0.14	30.50	0.13	0.04			7.80	7.10	21.0
6	11.20	0.65	0.15	0.15	30.80	0.13	0.04			7.70	7.00	21.0
7	11.50	0.79	0.12	0.13	30.00	0.12	0.04			7.60	7.00	21.0
8	10.40	0.79	0.11	0.14	23.80	0.10	0.03			7.70	7.00	21.0
9	9.50	0.67	0.12	0.13	25.00	0.10	0.03			7.70	7.00	23.0
10	9.10	0.73	0.12	0.12	30.00	0.12	0.04			7.80	7.10	23.0
11	9.60	0.76	0.12	0.12	29.40	0.12	0.04			7.80	7.10	23.0
12	9.70	0.82	0.13	0.13	25.20	0.10	0.04			7.60	7.20	23.0
13	9.10	0.78	0.09	0.11	26.70	0.11	0.04			7.70	7.20	23.0
14	10.60	1.20	0.11	0.10	33.50	0.14	0.05			7.70	7.10	23.0
15	11.70	0.89	0.12	0.11	29.80	0.12	0.04			7.80	7.10	23.0
16	11.00	1.20	0.11	0.13	36.30	0.15	0.05			7.90	7.00	24.0
17	9.60	0.86	0.17	0.13	35.20	0.13	0.04			7.80	7.10	24.0
18	8.10	0.87	0.18	0.15	11.30		0.04			7.80	7.10	24.0
19	7.90	1.06	0.18	0.17	11.10		0.05			7.70	7.10	24.0
20	7.70	0.99	0.20	0.20	6.70		0.04			7.80	7.20	24.0
21	7.80	1.40	0.21	0.20	11.80		0.04			7.80	7.20	24.0
22	8.50	1.50	0.21	0.21	18.00		0.04			7.80	7.10	23.0
23	10.10	1.20	0.18	0.21	25.40		0.04			7.70	7.10	23.0
24	12.60	0.82	0.17	0.19	24.40		0.03			7.90	7.10	23.0
25	9.20	0.52	0.16	0.16	18.70		0.03			7.80	7.20	23.0
26	8.10	0.52	0.16	0.17	31.10		0.03			8.00	7.30	23.0
27	8.90	0.60	0.17	0.15	19.90		0.03			7.90	7.10	23.0
28	8.20	0.64	0.15	0.16	20.50		0.03			8.00	7.20	23.0
29	8.30	0.61	0.18	0.17	18.50		0.03			7.90	7.20	23.0
30	8.20	0.61	0.18	0.18	21.20		0.03			8.00	7.30	23.0
31	10.20	0.70	0.19	0.19	23.40		0.03			7.90	7.20	23.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE AUG 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	14.50	0.90	0.20	0.22	21.90		0.03			7.80	7.20	23.0
2	19.10	0.91	0.21	0.20	18.90		0.03			8.00	7.20	23.0
3	14.30	0.78	0.16	0.15	22.20		0.03			7.90	7.10	23.0
4	10.40	0.89	0.19	0.18	17.70		0.03			8.00	7.20	23.0
5	9.40	0.68	0.19	0.21	23.00		0.03			7.90	7.10	23.0
6	9.60	0.69	0.19	0.19	21.80		0.03			7.90	7.10	23.0
7	9.30	0.59	0.21	0.19	33.90		0.05			7.80	7.00	23.0
8	7.70	0.63	0.16	0.16	21.30		0.04			7.80	7.10	23.0
9	6.80	0.39	0.11	0.12	26.30		0.04			7.80	7.10	23.0
10	7.30	0.39	0.14	0.14	21.10		0.04			7.80	7.10	24.0
11	7.80	0.37	0.14	0.15	29.60		0.05			7.70	7.00	24.0
12	9.60	0.70	0.11	0.11	24.90		0.04			7.80	7.00	24.0
13	9.90	0.50	0.13	0.12	29.90		0.05			8.00	7.10	24.0
14	8.00	0.41	0.12	0.10	24.10		0.04			7.90	7.20	24.0
15	7.50	0.41	0.11	0.11	28.40		0.05			7.90	7.10	24.0
16	8.10	0.62	0.13	0.12	25.30		0.05			7.80	7.10	24.0
17	7.60	0.61	0.12	0.11	31.90		0.05			7.80	7.20	24.0
18	8.10	0.49	0.13	0.14	24.30		0.05			7.90	7.20	24.0
19	8.70	0.72	0.14	0.12	32.80		0.05			7.90	7.10	24.0
20	6.90	0.69	0.12	0.13	24.30		0.05			7.80	7.20	23.0
21	7.00	0.50	0.13	0.14	32.70		0.05			7.80	7.20	23.0
22	6.50	0.55	0.15	0.14	28.60		0.05			7.80	7.20	23.0
23	6.10	0.53	0.14	0.11	32.40		0.05			7.90	7.20	22.0
24	5.90	0.72	0.13	0.11	30.30		0.05			7.90	7.20	22.0
25	5.70	0.69	0.11	0.11	15.10		0.06			7.70	7.10	22.0
26	6.80	0.62	0.12	0.13	26.60		0.05			7.80	7.10	22.0
27	7.20	0.50	0.14	0.13	28.60		0.05			7.90	7.10	22.0
28	6.70	0.46	0.15	0.13	27.90		0.04			7.90	7.20	22.0
29	5.90	0.37	0.12	0.13	32.20		0.04			7.80	7.20	22.0
30	5.90	0.44	0.12	0.12	28.20		0.04			7.80	7.20	23.0
31	7.50	0.64	0.13	0.13	32.00		0.04			7.90	7.20	22.0

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE SEP 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.30	0.67	0.13	0.14	24.50		0.04			7.80	7.20	21.0
2	9.90	0.56	0.15	0.15	30.20		0.04			7.80	7.10	21.0
3	6.70	0.94	0.12	0.11	27.70		0.04			7.80	7.10	21.0
4	6.60	0.45	0.10	0.10	33.80		0.04			7.80	7.20	21.0
5	8.00	0.55	0.17	0.12	31.30		0.04			7.70	7.10	21.0
6	5.90	0.42	0.15	0.14	27.20		0.04			7.80	7.20	21.0
7	7.20	0.36	0.16	0.15	29.70		0.04			7.80	7.20	21.0
8	6.70	0.40	0.18	0.18	34.50		0.04			7.80	7.20	21.0
9	8.70	0.58	0.16	0.13	24.80		0.04			7.70	7.10	21.0
10	8.00	0.75	0.19	0.18	26.00		0.04			7.70	7.10	21.0
11	9.30	0.85	0.18	0.16	29.50		0.05			7.70	7.00	22.0
12	10.70	0.65	0.13	0.12	28.40		0.05			7.70	7.00	22.0
13	13.80	0.96	0.13	0.12	29.60		0.05			7.80	7.00	20.0
14	14.80	0.89	0.14	0.16	26.90		0.05			7.80	7.10	20.0
15	10.20	0.81	0.17	0.16	29.80		0.05			7.80	7.00	20.0
16	10.20	0.71	0.15	0.14	32.00		0.05			7.80	7.00	20.0
17	10.40	0.79	0.17	0.16	25.40		0.05			7.90	7.10	20.0
18	10.10	0.68	0.22	0.21	27.00		0.05			7.90	7.10	20.0
19	10.20	0.66	0.21	0.18	27.50		0.05			7.80	7.10	20.0
20	7.80	0.66	0.16	0.15	24.00		0.04			7.80	7.00	21.0
21	7.30	0.91	0.18	0.17	23.30		0.04			7.80	7.10	21.0
22	12.00	0.65	0.16	0.16	35.80		0.05			7.80	7.10	21.0
23	7.40	0.44	0.12	0.11	23.70		0.04			7.80	7.10	21.0
24	6.30	0.27	0.03	0.04	34.60		0.05			7.90	7.20	20.0
25	5.20	0.25	0.03	0.04	28.10		0.05			7.90	7.20	20.0
26	5.00	0.20	0.03	0.03	35.50		0.06			7.80	7.20	19.0
27	5.80	0.22	0.03	0.04	26.00		0.05			7.80	7.20	18.0
28	5.20	0.17	0.03	0.03	28.00		0.05			7.90	7.10	17.0
29	4.50	0.21	0.03	0.03	27.90		0.04			7.80	7.10	17.0
30	4.70	0.14	0.02	0.03	24.60		0.05			7.80	7.10	17.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE OCT 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	5.50	0.29	0.03	0.04	17.10		0.05			7.70	7.20	17.0
2	4.20	0.18	0.03	0.04	29.20		0.05			7.90	7.20	17.0
3	3.30	0.19	0.03	0.03	25.70		0.04			7.80	7.20	16.0
4	3.80	0.26	0.03	0.03	28.90		0.05			7.80	7.00	16.0
5	18.00	0.46	0.03	0.04	31.40		0.04			7.70	7.20	16.0
6	6.00	0.26	0.03	0.03	33.30		0.05			7.80	7.10	15.0
7	4.30	0.21	0.03	0.04	28.30		0.04			7.80	7.20	15.0
8	4.50	0.33	0.02	0.02	30.10		0.05			7.80	7.10	14.0
9	4.60	0.28	0.02	0.02	38.10		0.05			7.70	7.00	14.0
10	4.20	0.98	0.10	0.15	40.40		0.05			7.80	7.20	14.0
11	4.40	0.35	0.05	0.19	14.80		0.05			7.80	7.20	14.0
12	3.90	0.19	0.03	0.12	25.00		0.05			7.70	7.20	14.0
13	5.20	0.19	0.04	0.07	22.50		0.05			7.80	7.10	14.0
14	4.70	0.19	0.04	0.07	29.90		0.05			7.80	7.20	14.0
15	5.10	0.28	0.03	0.04	30.30		0.05			7.70	7.20	14.0
16	5.60	0.22	0.04	0.04	35.00		0.05			7.70	7.10	14.0
17	4.20	0.24	0.03	0.03	30.00		0.05			7.70	7.10	14.0
18	3.80	0.15	0.03	0.04	36.00		0.06			7.70	7.00	14.0
19	4.80	0.17	0.05	0.04	30.10		0.05			7.60	7.00	14.0
20	7.70	0.29	0.03	0.05	35.70		0.05			7.60	7.00	14.0
21	15.60	0.30	0.04	0.04	30.50		0.05			7.60	7.00	14.0
22	20.50	0.32	0.04	0.04	35.00		0.06			7.80	6.90	14.0
23	16.80	0.49	0.05	0.05	26.20		0.05			7.80	7.10	14.0
24	10.60	0.41	0.04	0.05	29.90		0.06			7.80	7.10	14.0
25	10.60	0.57	0.04	0.04	24.80		0.05			7.90	7.10	14.0
26	5.90	0.27	0.04	0.04	29.60		0.05			7.80	7.00	14.0
27	5.30	0.26	0.04	0.04	25.80		0.05			7.80	7.00	14.0
28	5.90	0.28	0.04	0.04	29.90		0.06			7.70	7.10	13.0
29	5.80	0.30	0.04	0.04	25.20		0.05			7.80	7.10	13.0
30	7.90	0.32	0.03	0.04	31.20		0.06			7.80	7.20	12.0
31	9.10	1.30	0.05	0.04	25.80		0.05			7.70	7.10	11.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE NOV 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	14.00	0.66	0.04	0.04	30.50		0.06			7.70	7.10	11.0
2	22.30	0.44	0.04	0.04	29.60		0.06			7.70	7.10	11.0
3	20.70	0.57	0.06	0.06	31.50		0.06			7.70	7.20	11.0
4	20.60	0.71	0.06	0.06	26.00		0.05			7.80	7.20	11.0
5	22.00	0.58	0.05	0.07	31.20		0.06			7.70	7.20	11.0
6	16.00	3.10	0.04	0.04	24.80		0.04			7.80	7.20	10.0
7	17.70	3.50	0.03	0.04	31.40		0.05			7.80	7.10	10.0
8	16.50	3.20	0.03	0.04	27.60		0.04			7.90	7.20	10.0
9	13.70	2.80	0.03	0.04	31.90		0.05			7.80	7.10	10.0
10	26.50	4.60	0.05	0.04	26.10		0.04			8.10	7.20	10.0
11	51.60	6.90	0.06	0.05	52.80		0.05			8.20	7.10	9.0
12	51.80	5.00	0.04	0.05	52.90		0.06			8.00	7.10	9.0
13	40.40	2.40	0.06	0.07	46.70		0.06			8.10	7.10	9.0
14	34.40	1.70	0.05	0.06	51.20		0.06			8.00	7.00	9.0
15	22.00	1.00	0.04	0.05	59.50		0.06			8.10	7.10	9.0
16	21.00	0.60	0.04	0.04	63.80		0.05			8.10	7.10	9.0
17	44.00	0.59	0.05	0.05	34.90		0.06			8.00	7.00	9.0
18	28.00	0.43	0.04	0.05	76.20		0.05			8.10	7.00	8.0
19	23.00	0.42	0.05	0.06	53.50		0.05			8.10	7.10	8.0
20	50.00	1.30	0.06	0.06	74.80		0.05			8.10	7.10	8.0
21	31.30	1.60	0.11	0.11	61.70		0.06			7.80	6.80	8.0
22	25.80	1.30	0.09	0.10	74.30		0.05			7.60	6.80	7.0
23	27.20	1.50	0.11	0.11	62.20		0.06			7.70	6.70	7.0
24	24.20	1.70	0.10	0.13	72.70		0.05			7.60	6.80	7.0
25	17.20	0.99	0.11	0.11	59.90		0.06			7.60	6.80	6.0
26	23.00	0.86	0.12	0.12	52.50		0.05			7.60	6.80	6.0
27	38.00	2.50	0.21	0.19	52.20		0.06			7.70	7.10	6.0
28	46.00	2.10	0.12	0.15	71.90		0.05			7.70	7.10	6.0
29	64.00	2.40	0.18	0.15	63.50		0.06			7.80	7.10	6.0
30	64.00	2.10	0.13	0.14	71.60		0.06			7.80	7.00	6.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE DEC 1985

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	51.00	3.70	0.18	0.16	61.40	0.18	0.05			7.80	7.00	5.0
2	112.00	16.90	0.75	0.27	70.20	0.21	0.06			7.80	7.00	5.0
3	32.00	3.50	0.18	0.36	63.30	0.19	0.05			7.80	7.00	5.0
4	21.30	0.83	0.11	0.21	70.20	0.22	0.06			7.80	7.00	5.0
5	25.20	1.60	0.13	0.14	76.90	0.17	0.05			7.80	7.10	4.0
6	25.80	1.20	0.14	0.16	85.10	0.22	0.06			7.70	7.00	3.0
7	38.00	1.30	0.13	0.12	52.90	0.17	0.05			7.80	7.10	3.0
8	49.30	1.90	0.11	0.11	79.20	0.22	0.06			7.80	7.10	2.0
9	49.50	2.10	0.16	0.14	54.20	0.17	0.05			7.70	7.10	2.0
10	33.00	1.90	0.16	0.17	54.70	0.25	0.07			7.70	7.00	2.0
11	32.10	1.60	0.16	0.17	35.20	0.18	0.04			8.00	7.10	2.0
12	33.80	2.50	0.17	0.21	41.90	0.21	0.06			7.90	7.10	2.0
13	28.30	3.20	0.21	0.21	35.30	0.18	0.04			7.90	7.00	2.0
14	27.50	3.90	0.17	0.20	30.50	0.20	0.05			7.90	7.00	2.0
15	21.10	2.50	0.20	0.20	37.20	0.21	0.06			7.80	7.20	1.0
16	10.20	1.40	0.13	0.15	30.70	0.17	0.04			7.80	7.10	1.0
17	11.10	1.60	0.12	0.12	31.80	0.18	0.05			7.90	7.20	1.0
18	11.20	1.30	0.11	0.14	35.60	0.20	0.05			7.90	7.20	1.0
19	10.10	1.20	0.13	0.13	32.70	0.19	0.05			7.80	7.20	1.0
20	12.00	1.20	0.11	0.12	33.70	0.20	0.05			7.90	7.10	1.0
21	12.00	1.60	0.13	0.15	36.70	0.18	0.05			7.90	7.10	1.0
22	11.20	1.80	0.12	0.24	34.50	0.21	0.05			7.80	7.20	1.0
23	14.20	2.10	0.16	0.14	32.20	0.18	0.05			7.80	7.10	1.0
24	11.40	2.10	0.14	0.14	33.10	0.20	0.05			7.90	7.20	1.0
25	7.00	1.90	0.13	0.13	41.00	0.21	0.06			7.60	7.00	1.0
26	4.20	1.20	0.10	0.11	35.70	0.21	0.06			7.60	7.00	1.0
27	3.90	1.40	0.12	0.11	31.80	0.19	0.05			7.75	7.00	1.0
28	5.10	1.20	0.11	0.12	35.70	0.21	0.05			7.80	7.00	1.0
29	4.40	1.40	0.14	0.15	32.80	0.19	0.06			7.77	7.00	1.0
30	4.40	1.40	0.13	0.13	30.60	0.21	0.06			7.70	7.00	1.0
31	4.70	1.10	0.12	0.11	26.70	0.18	0.05			7.80	7.00	1.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE JAN 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	5.70	1.40	0.10	0.11	37.20	0.22	0.06			7.70	7.00	1.0
2	5.60	1.50	0.11	0.10	27.10	0.19	0.05			7.80	7.10	1.0
3	5.80	1.60	0.10	0.10	37.10	0.22	0.06			7.60	7.00	1.0
4	4.30	1.30	0.13	0.11	25.80	0.18	0.05			7.70	7.10	1.0
5	3.40	0.97	0.12	0.11	38.40	0.23	0.06			7.70	7.00	1.0
6	3.40	1.10	0.12	0.12	21.30	0.18	0.05			7.70	7.00	1.0
7	2.30	1.00	0.11	0.13	21.10	0.22	0.06			7.60	7.10	1.0
8	2.10	1.00	0.13	0.12	18.40	0.19	0.05			7.70	7.10	1.0
9	2.10	1.30	0.13	0.13	19.20	0.20	0.05			7.80	7.10	1.0
10	2.00	1.30	0.12	0.12	17.60	0.18	0.05			7.70	7.10	1.0
11	1.60	0.99	0.10	0.11	18.90	0.20	0.05			7.80	7.10	1.0
12	1.60	0.88	0.11	0.10	21.30	0.18	0.05			7.80	7.00	1.0
13	1.60	0.93	0.10	0.10	18.90	0.20	0.05			7.70	7.00	1.0
14	1.30	0.77	0.11	0.12	17.60	0.18	0.05			7.70	7.00	1.0
15	1.30	0.66	0.12	0.11	20.30	0.21	0.05			7.80	7.10	1.0
16	1.40	0.56	0.11	0.11	17.60	0.18	0.05			7.60	7.10	1.0
17	1.50	0.53	0.12	0.13	17.80	0.18	0.05			7.60	7.10	1.0
18	1.40	0.76	0.13	0.13	14.60	0.15	0.05			7.60	7.20	1.0
19	2.00	1.10	0.14	0.12	19.80	0.20	0.05			7.50	7.20	1.0
20	4.80	1.30	0.14	0.13	16.50	0.16	0.04			7.60	7.10	1.0
21	6.10	2.70	0.13	0.13	19.20	0.19	0.05			7.60	7.20	1.0
22	7.40	3.60	0.15	0.13	36.90	0.18	0.05			7.50	7.10	1.0
23	3.70	2.20	0.15	0.20	16.80	0.18	0.05			7.50	7.10	1.0
24	2.30	0.97	0.13	0.15	22.00	0.18	0.05			7.60	7.20	1.0
25	3.40	0.98	0.10	0.13	15.40	0.16	0.04			7.60	7.00	1.0
26	3.10	1.10	0.11	0.12	13.10	0.18	0.05			7.60	7.10	1.0
27	4.80	1.20	0.10	0.10	15.40	0.15	0.04			7.60	7.10	1.0
28	3.00	1.10	0.11	0.12	16.00	0.16	0.04			7.50	7.20	1.0
29	2.30	1.06	0.12	0.12	12.60	0.17	0.05			7.70	7.20	1.0
30	1.90	0.85	0.10	0.11	17.50	0.18	0.05			7.70	7.20	1.0
31	1.80	0.86	0.12	0.10	16.40	0.17	0.05			7.80	7.20	1.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE FEB 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	1.80	0.92	0.12	0.11	17.70	0.18	0.05			7.70	7.10	1.0
2	1.90	0.90	0.11	0.12	16.30	0.17	0.05			7.70	7.10	1.0
3	1.90	0.81	0.10	0.11	13.20	0.18	0.05			7.70	7.10	1.0
4	2.00	0.78	0.13	0.15	16.60	0.17	0.05			7.70	7.10	1.0
5	11.80	3.00	0.20	0.16	18.20	0.19	0.05			7.80	7.20	1.0
6	27.60	6.50	0.21	0.21	36.20	0.17	0.05			7.70	7.20	1.0
7	14.20	2.00	0.12	0.19	37.60	0.19	0.05			8.40	7.10	1.0
8	35.00	7.20	0.22	0.20	31.40	0.16	0.04			7.90	7.10	1.0
9	24.00	4.40	0.16	0.18	42.50	0.20	0.05			7.90	7.00	1.0
10	23.00	5.50	0.18	0.19	35.20	0.16	0.04			7.80	7.00	1.0
11	18.00	4.70	0.15	0.18	32.50	0.19	0.05			7.70	7.00	1.0
12	15.00	5.60	0.15	0.18	29.00	0.15	0.04			7.70	7.00	1.0
13	15.10	4.40	0.18	0.17	25.50	0.15	0.04			7.80	7.10	1.0
14	11.20	3.20	0.13	0.16	33.20	0.17	0.05			7.80	7.20	1.0
15	7.30	1.80	0.12	0.12	20.40	0.14	0.04			7.90	7.20	1.0
16	5.80	1.80	0.11	0.12	30.40	0.18	0.05			7.80	7.20	1.0
17	4.40	1.80	0.12	0.14	29.20	0.15	0.04			7.80	7.20	1.0
18	4.50	1.40	0.13	0.16	31.00	0.18	0.05			7.70	7.10	1.0
19	6.50	1.80	0.15	0.18	29.90	0.15	0.04			7.70	7.10	1.0
20	20.50	5.00	0.20	0.21	41.50	0.18	0.05			7.60	7.20	1.0
21	13.20	3.50	0.19	0.20	34.10	0.17	0.04			7.60	7.00	1.0
22	7.90	1.70	0.15	0.20	32.50	0.19	0.05			7.60	7.10	1.0
23	8.00	1.80	0.15	0.15	34.10	0.18	0.05			7.60	7.00	1.0
24	5.10	1.50	0.12	0.14	33.10	0.20	0.05			7.60	7.00	1.0
25	4.30	1.10	0.12	0.11	36.70	0.17	0.05			7.60	7.00	1.0
26	3.50	0.92	0.09	0.10	39.20	0.18	0.05			7.70	7.10	1.0
27	4.10	1.20	0.12	0.13	23.40	0.16	0.05			7.60	7.00	1.0
28	4.40	1.30	0.11	0.14	32.50	0.19	0.05			7.70	7.10	1.0
29												
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TABLE 2.1: PARTICULATE REMOVAL PROFILE MAR 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	2.90	0.99	0.12	0.13	27.40	0.16	0.05			7.60	7.00	1.0
2	2.70	0.86	0.13	0.14	30.50	0.18	0.05			7.60	7.00	1.0
3	2.80	0.86	0.15	0.14	27.70	0.17	0.05			7.70	7.10	1.0
4	3.60	1.10	0.12	0.13	37.80	0.24	0.05			7.60	7.00	1.0
5	3.50	1.40	0.12	0.12	32.00	0.17	0.04			7.50	6.90	1.0
6	6.90	1.90	0.10	0.10	36.50	0.19	0.05			7.50	6.90	1.0
7	7.20	2.30	0.11	0.10	36.70	0.19	0.05			7.70	6.90	1.0
8	4.20	1.50	0.12	0.12	34.60	0.18	0.05			7.70	7.00	1.0
9	3.50	1.20	0.12	0.12	27.10	0.19	0.05			7.60	7.00	1.0
10	7.00	1.60	0.12	0.11	34.00	0.18	0.05			7.60	6.90	1.0
11	112.00	15.10	0.63	0.21	50.30	0.19	0.05			7.60	6.90	1.0
12	66.60	9.70	0.61	0.68	52.00	0.20	0.05			8.00	6.90	1.0
13	43.00	4.40	0.13	0.51	50.50	0.19	0.05			7.90	6.80	1.0
14	42.00	4.40	0.19	0.34	49.30	0.19	0.05			8.10	6.90	1.0
15	32.80	3.90	0.19	0.25	33.20	0.17	0.05			7.80	6.80	1.0
16	21.00	3.20	0.16	0.19	35.80	0.15	0.04			7.90	6.90	1.0
17	17.00	3.00	0.14	0.16	36.70	0.15	0.04			7.90	7.00	1.0
18	12.20	2.80	0.15	0.15	46.90	0.19	0.05			7.60	6.90	1.0
19	51.70	4.90	0.20	0.15	46.30	0.18	0.05			7.80	7.00	1.0
20	53.50	6.90	0.24	0.19	44.40	0.18	0.05			7.70	7.00	1.0
21	35.70	2.00	0.12	0.18	54.60	0.17	0.05			7.80	7.00	1.0
22	9.50	2.30	0.12	0.13	33.40	0.17	0.05			7.70	7.00	1.0
23	20.70	1.40	0.11	0.11	70.90	0.17	0.05			7.70	6.80	1.0
24	15.40	1.60	0.10	0.11	34.60	0.17	0.04			7.60	6.70	1.0
25	12.60	1.20	0.12	0.11	36.50	0.18	0.05			7.80	6.90	1.0
26	12.50	0.78	0.13	0.14	50.30	0.17	0.04			7.80	6.90	2.0
27	18.00	1.60	0.15	0.14	41.00	0.16	0.04			7.80	7.00	2.0
28	11.60	1.20	0.15	0.15	48.20	0.16	0.04			7.80	7.00	3.0
29	13.40	0.99	0.15	0.16	40.20	0.16	0.04			7.70	7.00	3.0
30	13.60	1.30	0.15	0.13	36.00	0.16	0.04			7.50	7.00	4.0
31	12.50	0.73	0.12	0.12	41.20	0.16	0.04			7.70	7.00	5.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE APR 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.40	0.66	0.10	0.10	42.40	0.17	0.05			7.80	7.00	5.0
2	11.90	0.60	0.10	0.10	41.60	0.17	0.05			7.80	7.00	5.0
3	11.80	0.65	0.13	0.13	44.90	0.18	0.05			7.70	7.00	5.0
4	20.50	1.10	0.16	0.14	52.10	0.18	0.05			7.80	7.00	5.0
5	22.10	1.20	0.16	0.16	51.80	0.18	0.05			7.80	7.00	5.0
6	22.40	1.40	0.20	0.20	44.30	0.18	0.05			7.70	7.00	5.0
7	20.20	1.20	0.17	0.17	35.50	0.17	0.05			7.80	7.00	5.0
8	20.40	2.00	0.15	0.16	44.30	0.18	0.05			7.80	7.00	5.0
9	13.50	2.20	0.15	0.16	39.80	0.18	0.05			7.80	7.00	6.0
10	7.20	1.70	0.12	0.13	51.80	0.18	0.05			7.80	7.00	6.0
11	7.16	1.40	0.13	0.14	54.20	0.19	0.05			7.80	7.00	6.0
12	8.80	1.10	0.13	0.15	44.40	0.17	0.04			7.70	6.90	6.0
13	11.90	1.30	0.15	0.17	46.50	0.18	0.05			7.70	6.90	7.0
14	17.80	1.90	0.14	0.17	47.60	0.16	0.04			7.70	7.00	7.0
15	21.70	2.80	0.16	0.18	35.60	0.18	0.05			7.80	7.00	8.0
16	21.50	1.20	0.38	0.29	52.30	0.18	0.05			7.80	7.10	8.0
17	22.50	1.30	0.19	0.21	55.00	0.18	0.05			7.80	7.10	7.0
18	18.00	0.91	0.16	0.18	42.20	0.17	0.05			7.90	7.00	7.0
19	12.00	0.84	0.16	0.14	30.90	0.16	0.05			7.90	7.00	7.0
20	12.30	0.86	0.14	0.14	31.10	0.18	0.05			7.90	7.10	7.0
21	13.00	1.10	0.15	0.19	28.40	0.18	0.05			7.90	7.10	7.0
22	17.00	1.90	0.19	0.17	28.00	0.17	0.04			7.90	7.10	7.0
23	13.50	0.74	0.19	0.19	44.20	0.18	0.05			7.90	7.10	7.0
24	13.70	1.20	0.18	0.20	25.30	0.17	0.05			7.80	7.10	7.0
25	14.80	1.50	0.21	0.16	29.10	0.17	0.05			7.80	7.10	9.0
26	10.30	0.87	0.15	0.14	26.20	0.15	0.05			7.90	7.20	10.0
27	7.00	0.45	0.14	0.13	34.40	0.18	0.04			7.90	7.20	10.0
28	6.60	0.77	0.18	0.16	25.90	0.15	0.05			7.80	7.10	11.0
29	9.80	1.30	0.15	0.15	32.00	0.17	0.04			7.80	7.10	11.0
30	7.10	0.64	0.16	0.15	32.90	0.16	0.04			7.90	7.20	11.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE MAY 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	13.10	1.90	0.16	0.16	26.80	0.18	0.04			7.90	7.10	11.0
2	17.60	1.40	0.16	0.18	33.50	0.17	0.04			7.80	7.00	11.0
3	11.10	1.00	0.16	0.15	32.10	0.16	0.04			7.80	7.10	11.0
4	14.10	0.92	0.16	0.15	29.10	0.17	0.04			7.80	7.10	10.0
5	18.30	0.86	0.15	0.15	30.70	0.15	0.04			7.90	7.10	10.0
6	12.60	0.45	0.13	0.13	32.80	0.16	0.04			8.00	7.30	11.0
7	7.30	0.46	0.13	0.13	32.70	0.16	0.04			8.00	7.20	11.0
8	6.70	0.55	0.14	0.13	31.90	0.15	0.04			7.90	7.10	11.0
9	6.80	0.57	0.17	0.13	33.10	0.16	0.04			7.80	7.10	11.0
10	9.90	0.96	0.17	0.17	25.50	0.16	0.04			8.00	7.20	11.0
11	9.40	10.90	0.20	0.17	25.70	0.17	0.04			7.80	7.10	11.0
12	8.40	0.91	0.17	0.19	11.40	0.15	0.04			7.90	7.20	11.0
13	9.90	0.94	0.15	0.15	40.00	0.16	0.04			7.80	7.10	11.0
14	8.60	1.00	0.14	0.14	47.20	0.16	0.04			7.90	7.10	15.0
15	8.50	0.79	0.15	0.14	30.70	0.16	0.04			7.90	7.10	15.0
16	9.80	0.98	0.18	0.14	23.20	0.16	0.04			7.80	7.00	15.0
17	9.00	0.94	0.16	0.18	22.50	0.16	0.04			7.90	7.00	15.0
18	7.20	0.86	0.15	0.17	34.40	0.18	0.05			7.90	7.00	15.0
19	9.60	1.20	0.17	0.15	24.90	0.17	0.05			7.90	7.00	15.0
20	10.80	0.88	0.15	0.17	22.20	0.18	0.05			7.90	7.10	13.0
21	9.60	0.83	0.16	0.15	22.20	0.18	0.05			7.90	7.00	13.0
22	7.60	0.92	0.15	0.15	16.40	0.17	0.05			7.90	7.00	13.0
23	8.50	0.89	0.15	0.15	21.10	0.17	0.05			7.90	7.00	13.0
24	6.80	0.85	0.15	0.14	18.20	0.15	0.05			7.90	7.00	13.0
25	6.70	1.10	0.15	0.14	26.00	0.15	0.04			7.80	7.00	13.0
26	7.30	1.20	0.18	0.17	25.70	0.15	0.04			7.90	7.10	14.0
27	6.40	1.10	0.19	0.16	25.00	0.17	0.05			7.80	7.10	14.0
28	6.40	0.84	0.21	0.19	18.20	0.15	0.04			7.80	7.10	14.0
29	7.10	0.80	0.22	0.20	14.20	0.15	0.04			7.80	7.10	15.0
30	8.10	0.89	0.20	0.20	28.30	0.15	0.04			7.80	7.00	16.0
31	8.30	1.12	0.19	0.19	15.20	0.13	0.03			7.70	7.00	16.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUN 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	7.60	1.01	0.18	0.19	27.60	0.14	0.04			7.80	7.10	15.0
2	13.10	0.91	0.16	0.16	26.60	0.16	0.04			7.80	7.20	14.0
3	18.20	0.82	0.19	0.18	18.50	0.15	0.04			7.70	7.20	15.0
4	18.80	1.10	0.16	0.16	27.60	0.14	0.04			8.00	7.20	15.0
5	15.00	0.75	0.19	0.17	27.90	0.16	0.04			7.80	7.20	16.0
6	11.70	0.74	0.19	0.22	28.60	0.16	0.04			7.90	7.10	17.0
7	12.80	0.72	0.19	0.20	30.00	0.15	0.04			7.80	7.20	17.0
8	11.40	0.85	0.20	0.21	26.70	0.15	0.04			7.90	7.20	17.0
9	9.60	0.81	0.18	0.17	29.00	0.14	0.04			7.90	7.10	17.0
10	8.90	0.79	0.15	0.16	26.80	0.15	0.04			7.90	7.10	17.0
11	11.00	0.72	0.18	0.17	31.70	0.16	0.04			7.80	7.20	17.0
12	14.00	0.91	0.22	0.23	39.10	0.18	0.04			7.90	7.20	15.0
13	26.00	1.00	0.20	0.21	46.70	0.16	0.04			7.80	7.10	16.0
14	16.00	0.69	0.21	0.24	27.90	0.14	0.04			7.90	7.10	16.0
15	13.00	0.78	0.24	0.26	43.20	0.16	0.04			7.80	7.10	16.0
16	15.00	0.98	0.22	0.27	32.90	0.14	0.04			7.90	7.20	16.0
17	17.00	1.20	0.22	0.23	33.70	0.15	0.04			7.90	7.10	16.0
18	14.00	0.86	0.17	0.17	34.70	0.16	0.04			7.80	7.10	19.0
19	13.00	0.70	0.18	0.16	31.10	0.16	0.04			7.90	7.00	14.0
20	16.30	0.83	0.21	0.20	30.40	0.16	0.04			7.90	7.10	19.0
21	15.50	0.76	0.22	0.21	36.90	0.15	0.04			7.60	6.80	19.0
22	13.70	0.80	0.21	0.17	35.70	0.15	0.04			7.60	6.80	19.0
23	13.50	0.77	0.17	0.17	33.90	0.14	0.04			7.60	6.80	19.0
24	12.50	1.10	0.18	0.17	39.00	0.16	0.04			7.70	6.80	19.0
25	12.50	1.20	0.19	0.17	34.80	0.14	0.04			7.80	7.00	19.0
26	13.50	1.00	0.18	0.16	29.80	0.15	0.04			7.80	7.00	19.0
27	12.80	1.30	0.20	0.18	27.20	0.14	0.04			7.80	7.00	19.0
28	11.60	0.84	0.20	0.19	30.80	0.14	0.04			7.80	7.00	19.0
29	10.40	0.86	0.19	0.18	31.00	0.14	0.04			7.70	7.00	19.0
30	13.30	1.10	0.22	0.20	35.30	0.16	0.04			7.80	7.00	19.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE JUL 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	16.30	1.30	0.21	0.20	34.20	0.16	0.04			7.80	7.00	19.0
2	14.00	0.96	0.23	0.21	30.20	0.16	0.04			7.80	7.10	20.0
3	13.30	1.40	0.24	0.22	35.10	0.15	0.04			7.70	7.10	20.0
4	13.20	1.20	0.21	0.21	33.90	0.14	0.04			7.70	7.10	20.0
5	15.00	1.10	0.19	0.18	29.70	0.12	0.03			7.70	7.20	21.0
6	14.50	0.95	0.19	0.19	32.80	0.12	0.03			7.80	7.20	21.0
7	13.00	0.96	0.18	0.18	28.60	0.11	0.03			7.80	7.20	21.0
8	11.00	1.30	0.22	0.21	33.60	0.14	0.04			7.70	7.20	22.0
9	10.60	0.77	0.18	0.17	39.00	0.16	0.04			7.70	7.10	22.0
10	11.20	0.96	0.17	0.16	34.10	0.14	0.03			7.70	7.00	22.0
11	11.50	1.40	0.16	0.15	42.10	0.17	0.04			7.70	7.00	22.0
12	16.00	0.89	0.19	0.18	30.50	0.15	0.04			7.80	7.10	22.0
13	14.60	0.82	0.18	0.17	30.70	0.15	0.04			7.70	7.00	22.0
14	13.00	1.10	0.19	0.17	30.00	0.15	0.04			7.80	7.10	22.0
15	10.00	0.74	0.16	0.16	27.40	0.14	0.04			7.80	7.10	23.0
16	9.10	0.62	0.19	0.17	30.20	0.15	0.04			7.80	7.10	23.0
17	10.60	0.85	0.23	0.22	14.20	0.15	0.04			7.70	7.00	23.0
18	9.40	1.00	0.24	0.25	12.00	0.12	0.03			7.80	7.10	23.0
19	9.70	0.71	0.24	0.23	15.90	0.14	0.04			7.80	7.10	23.0
20	9.50	0.79	0.22	0.22	14.90	0.14	0.04			7.70	7.00	23.0
21	9.60	0.99	0.23	0.23	16.70	0.14	0.04			7.80	7.10	23.0
22	11.00	1.30	0.21	0.22	26.60	0.14	0.04			7.80	7.10	23.0
23	9.40	0.89	0.20	0.19	12.90	0.13	0.04			7.50	7.00	24.0
24	9.00	1.00	0.19	0.17	32.90	0.14	0.04			7.50	7.00	24.0
25	9.70	0.78	0.19	0.17	43.70	0.15	0.04			7.60	7.00	24.0
26	10.90	1.10	0.24	0.24	29.60	0.15	0.04			7.60	7.00	24.0
27	10.90	0.91	0.24	0.23	44.90	0.15	0.04			7.50	6.80	24.0
28	8.90	0.76	0.21	0.21	28.50	0.15	0.04			7.50	6.80	24.0
29	8.90	0.20	0.22	0.21	22.80	0.16	0.04			7.80	7.10	24.0
30	10.80	0.92	0.22	0.23	30.50	0.14	0.04			7.90	7.10	24.0
31	10.80	1.10	0.21	0.21	28.50	0.15	0.04			7.90	7.00	24.0

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 2.1: PARTICULATE REMOVAL PROFILE AUG 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.20	1.40	0.22	0.21		0.14	0.04			7.90	7.00	24.0
2	9.60	2.00	0.21	0.21		0.15	0.04			7.90	7.00	24.0
3	9.00	1.50	0.24	0.22		0.16	0.04			7.90	7.00	24.0
4	9.00	0.94	0.23	0.21		0.14	0.04			7.80	7.00	24.0
5	7.40	0.80	0.30	0.26		0.15	0.04			7.80	7.00	23.0
6	8.10	0.91	0.24	0.24		0.15	0.04			7.80	7.10	23.0
7	8.40	0.75	0.25	0.28		0.17	0.05			7.90	7.20	23.0
8	7.70	1.30	0.27	0.26		0.16	0.04			7.90	7.30	23.0
9	8.70	1.40	0.22	0.21		0.15	0.04			7.80	7.20	23.0
10	8.00	1.20	0.20	0.20		0.16	0.04			7.80	7.20	23.0
11	6.30	2.20	0.20	0.20		0.15	0.04			7.90	7.20	23.0
12	8.20	1.50	0.23	0.22		0.17	0.04			7.90	7.20	22.0
13	7.80	1.60	0.22	0.21		0.18	0.04			7.70	7.20	22.0
14	7.30	1.70	0.25	0.24		0.18	0.04			7.70	7.00	22.0
15	6.90	1.30	0.25	0.24		0.16	0.04			7.60	6.90	23.0
16	6.90	0.77	0.26	0.24		0.15	0.04			7.70	7.10	24.0
17	6.80	0.80	0.27	0.26		0.17	0.05			7.70	7.10	24.0
18	8.20	0.98	0.25	0.23		0.15	0.04			7.70	6.80	25.0
19	11.80	1.10	0.23	0.21		0.16	0.04			7.70	7.00	25.0
20	10.40	0.80	0.23	0.23		0.15	0.04			7.70	7.10	25.0
21	10.30	0.87	0.28	0.28		0.15	0.05			7.70	7.00	25.0
22	9.60	1.20	0.28	0.26		0.15	0.04			7.60	6.90	25.0
23	11.00	1.60	0.33	0.32		0.15	0.04			7.70	7.00	25.0
24	12.00	2.10	0.34	0.35		0.15	0.04			7.70	7.00	25.0
25	11.00	1.20	0.24	0.26		0.15	0.04			7.60	6.90	25.0
26	11.00	1.00	0.23	0.23		0.17	0.05			7.70	7.00	25.0
27	12.00	2.10	0.21	0.21		0.17	0.05			7.70	7.00	21.0
28	10.90	1.30	0.21	0.21		0.17	0.05			7.70	6.90	21.0
29	11.30	1.30	0.21	0.20		0.17	0.05			7.70	6.90	19.0
30	11.30	0.97	0.20	0.21		0.16	0.04			7.70	6.90	19.0
31	9.90	1.50	0.23	0.23		0.17	0.04			7.70	6.90	19.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE SEP 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.70	1.30	0.24	0.24	42.70	0.15	0.04			7.70	7.00	19.0
2	7.20	1.40	0.25	0.32	36.10	0.15	0.04			7.80	7.00	19.0
3	8.20	1.80	0.25	0.24	32.50	0.15	0.04			7.90	7.00	19.0
4	7.30	1.20	0.26	0.26	45.70	0.19	0.05			7.90	7.00	20.0
5	7.50	2.20	0.28	0.25	41.00	0.17	0.05			7.90	7.00	20.0
6	7.80	1.90	0.26	0.25	35.20	0.16	0.04			7.90	7.00	20.0
7	7.70	1.60	0.25	0.24	38.40	0.18	0.05			7.70	7.10	18.0
8	7.70	1.20	0.23	0.23	26.90	0.16	0.04			7.80	7.10	18.0
9	7.30	1.10	0.23	0.23	31.60	0.16	0.04			7.80	7.10	19.0
10	7.10	0.83	0.24	0.23	32.60	0.17	0.05			7.80	7.10	19.0
11	9.60	0.87	0.35	0.26	24.20	0.17	0.04			7.80	7.10	19.0
12	9.20	1.90	0.35	0.30	35.30	0.18	0.05			7.80	7.10	19.0
13	8.60	1.70	0.24	0.26	24.00	0.17	0.04			7.80	7.20	19.0
14	8.50	1.40	0.22	0.23	28.50	0.20	0.05			7.80	7.10	19.0
15	9.50	1.60	0.23	0.21	25.20	0.17	0.05			7.80	7.30	18.0
16	15.70	1.70	0.27	0.25	24.30	0.17	0.05			7.80	7.30	18.0
17	15.20	2.00	0.27	0.28	33.90	0.18	0.05			7.80	7.20	18.0
18	17.30	1.10	0.25	0.25	28.00	0.19	0.05			7.60	7.10	18.0
19	11.30	0.82	0.25	0.27	32.10	0.19	0.05			7.50	7.00	18.0
20	9.40	0.69	0.26	0.26	25.10	0.17	0.05			7.50	7.00	19.0
21	10.00	0.72	0.25	0.26	35.90	0.19	0.05			7.40	7.10	19.0
22	8.80	0.93	0.28	0.29	36.30	0.19	0.05			7.50	7.10	20.0
23	8.70	0.67	0.23	0.23	37.20	0.19	0.05			7.60	7.10	20.0
24	9.40	0.73	0.26	0.25	46.80	0.19	0.05			7.50	7.00	20.0
25	8.70	0.94	0.29	0.29	24.40	0.19	0.05			7.60	7.10	20.0
26	12.00	1.10	0.33	0.31	10.10	0.19	0.05			7.50	7.00	20.0
27	18.00	0.99	0.33	0.32	43.80	0.18	0.05			7.50	7.10	20.0
28	28.00	0.98	0.30	0.29	55.60	0.19	0.05			7.60	7.00	20.0
29	19.00	0.96	0.28	0.30	45.90	0.17	0.05			7.50	7.00	20.0
30	15.00	0.89	0.32	0.32	32.20	0.17	0.05			7.60	7.10	20.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE OCT 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	12.00	1.35	0.29	0.29	46.00	0.17	0.05			7.60	7.10	19.0
2	11.60	0.81	0.10	0.10	41.60	0.19	0.05			7.50	7.00	19.0
3	12.30	0.92	0.09	0.09	46.30	0.19	0.05			7.50	6.90	19.0
4	23.80	0.89	0.16	0.16	43.50	0.18	0.05			7.50	6.90	19.0
5	31.70	2.50	0.19	0.18	61.70	0.18	0.05			7.40	9.80	17.0
6	14.10	1.50	0.12	0.16	34.90	0.18	0.05			7.40	9.80	17.0
7	11.60	1.70	0.12	0.16	37.50	0.19	0.05			7.60	7.00	16.0
8	13.60	0.93	0.12	0.12	34.60	0.20	0.05			7.80	7.10	15.0
9	12.50	0.96	0.13	0.12	35.10	0.21	0.05			7.80	7.00	15.0
10	15.50	1.40	0.12	0.11	29.80	0.20	0.05			7.70	7.10	15.0
11	19.20	1.60	0.11	0.11	33.30	0.20	0.05			7.70	7.10	15.0
12	18.80	1.20	0.15	0.13	44.90	0.21	0.05			7.70	7.10	15.0
13	17.50	1.10	0.19	0.17	37.30	0.19	0.05			7.80	7.00	15.0
14	20.60	1.60	0.19	0.16	43.40	0.20	0.05			7.80	7.00	14.0
15	22.00	1.90	0.18	0.17	56.50	0.21	0.06			7.80	7.10	14.0
16	14.30	1.70	0.21	0.20	50.10	0.21	0.06			7.90	7.10	12.0
17	14.40	1.30	0.17	0.17	44.30	0.20	0.05			7.80	7.10	11.0
18	11.80	1.30	0.13	0.13	47.90	0.20	0.05			7.70	7.10	11.0
19	13.00	0.95	0.12	0.12	48.80	0.20	0.05			7.80	7.20	11.0
20	13.20	0.70	0.12	0.11	47.40	0.20	0.05			7.80	7.10	11.0
21	11.80	0.80	0.13	0.14	54.00	0.20	0.05			7.70	7.10	12.0
22	10.10	0.71	0.14	0.14	33.80	0.20	0.05			7.70	7.10	15.0
23	11.00	0.84	0.13	0.13	49.40	0.20	0.05			7.80	7.10	15.0
24	10.80	1.30	0.15	0.14	50.40	0.21	0.06			7.70	7.10	15.0
25	11.70	1.50	0.15	0.15	47.60	0.20	0.05			7.50	7.10	15.0
26	11.20	1.30	0.16	0.15	48.80	0.20	0.04			7.70	7.20	15.0
27	10.60	1.80	0.16	0.14	44.80	0.19	0.05			7.70	7.10	15.0
28	9.10	2.10	0.13	0.15	50.90	0.21	0.06			7.60	7.10	15.0
29	10.40	2.20	0.39	0.17	44.50	0.21	0.05			7.70	7.10	15.0
30	8.30	1.90	0.22	0.26	42.70	0.20	0.05			7.70	7.10	15.0
31	8.50	1.80	0.16	0.21	67.10	0.21	0.06			7.60	7.10	15.0

TABLE 2.1: PARTICULATE REMOVAL PROFILE NOV 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	9.50	1.60	0.15	0.15	48.00	0.20	0.05			7.70	7.10	15.0
2	9.90	1.40	0.16	0.16	53.90	0.20	0.05			7.60	7.10	15.0
3	12.00	1.50	0.15	0.16	54.10	0.20	0.05			7.70	7.10	15.0
4	14.00	1.40	0.14	0.14	53.60	0.21	0.05			7.70	7.00	15.0
5	8.00	0.68	0.14	0.14	54.40	0.22	0.06			7.60	6.90	10.0
6	9.50	0.81	0.12	0.12	52.30	0.22	0.06			7.60	6.90	10.0
7	8.50	0.39	0.13	0.13	50.40	0.21	0.06			7.50	6.80	10.0
8	11.50	0.58	0.13	0.13	58.10	0.20	0.05			7.50	6.80	10.0
9	22.00	0.96	0.14	0.14	39.60	0.20	0.06			7.60	6.90	10.0
10	13.90	1.00	0.14	0.14	49.30	0.20	0.05			7.60	6.90	10.0
11	8.00	0.82	0.14	0.14	53.10	0.22	0.06			7.60	6.90	10.0
12	10.20	1.10	0.13	0.14	45.90	0.21	0.06			7.60	7.00	8.0
13	16.70	1.50	0.14	0.14	58.90	0.24	0.06			7.60	7.00	5.0
14	14.50	1.10	0.13	0.12	46.90	0.20	0.05			7.60	7.00	5.0
15	15.30	0.91	0.15	0.15	56.90	0.21	0.06			7.60	7.00	4.0
16	13.30	0.64	0.14	0.13	55.80	0.23	0.06			7.60	7.00	4.0
17	13.20	0.69	0.14	0.13	58.90	0.22	0.06			7.60	7.00	4.0
18	15.20	0.87	0.15	0.15	61.60	0.23	0.06			7.60	7.00	3.0
19	26.00	1.20	0.13	0.14	65.10	0.22	0.06			7.70	7.00	3.0
20	29.00	1.30	0.17	0.15	58.00	0.24	0.06			7.60	7.00	3.0
21	27.50	1.40	0.17	0.16	55.70	0.23	0.06			7.60	7.00	3.0
22	21.00	0.95	0.16	0.16	54.40	0.23	0.06			7.70	7.10	3.0
23	18.00	0.89	0.16	0.13	58.50	0.24	0.07			7.60	7.00	3.0
24	15.40	1.50	0.18	0.15	47.30	0.22	0.06			7.60	7.00	3.0
25	12.00	0.92	0.16	0.16	58.00	0.22	0.06			7.60	7.10	3.0
26	9.60	0.92	0.15	0.15	50.80	0.21	0.06			7.60	7.10	3.0
27	12.30	1.11	0.19	0.13	50.80	0.23	0.06			7.60	7.10	3.0
28	17.00	1.13	0.15	0.14	57.00	0.22	0.07			7.50	7.00	3.0
29	17.70	0.84	0.17	0.15	46.40	0.19	0.05			7.60	7.00	3.0
30	11.20	0.98	0.16	0.15	54.20	0.21	0.06			7.50	7.10	3.0
31												

TABLE 2.1: PARTICULATE REMOVAL PROFILE DEC 1986

DATE	TURBIDITY (FTU)				COAGULANT	COAG. AID	FILTER AID	METAL RES. Al (mg/L)		pH		TEMP DEG. C.
	Raw	Set.	Filter	Treat.	mg/L	mg/L	mg/L	Raw	Treat.	Raw	Treat.	
1	10.90	0.92	0.14	0.14	49.60	0.21	0.06			7.60	7.10	3.0
2	29.20	0.73	0.14	0.06	54.50	0.23	0.06			7.70	7.10	3.0
3	54.20	1.40	0.15	0.15	56.00	0.22	0.06			7.60	7.10	3.0
4	59.10	2.10	0.18	0.17	67.80	0.23	0.06			7.70	7.10	3.0
5	30.00	1.20	0.13	0.14	51.40	0.23	0.06			7.60	7.10	3.0
6	26.00	1.40	0.14	0.15	55.80	0.22	0.06			7.70	7.10	3.0
7	14.00	1.10	0.16	0.15	57.60	0.23	0.06			7.60	7.10	3.0
8	13.00	1.10	0.15	0.14	55.60	0.22	0.06			7.60	7.10	3.0
9	28.00	0.96	0.15	0.14	70.50	0.23	0.06			7.70	7.10	3.0
10	51.00	1.90	0.19	0.16	58.60	0.24	0.07			7.40	7.00	1.0
11	33.30	0.97	0.15	0.15	52.30	0.22	0.06			7.40	7.00	1.0
12	35.00	1.14	0.15	0.15	44.90	0.19	0.06			7.40	6.90	1.0
13	25.00	1.50	0.15	0.14	44.40	0.18	0.05			7.40	6.90	1.0
14	23.30	1.40	0.15	0.14	53.70	0.18	0.05			7.40	7.00	1.0
15	20.00	1.10	0.16	0.16	43.20	0.18	0.05			7.50	7.00	1.0
16	21.60	1.10	0.14	0.14	46.20	0.19	0.05			7.50	7.00	1.0
17	19.30	1.40	0.15	0.15	54.90	0.21	0.05			7.50	7.00	1.0
18	18.20	1.30	0.24	0.17	60.80	0.23	0.06			7.50	7.00	1.0
19	13.30	0.90	0.14	0.18	59.30	0.25	0.06			7.50	6.90	1.0
20	14.80	0.76	0.14	0.14	67.10	0.23	0.06			7.40	7.00	1.0
21	20.70	0.98	0.14	0.13	54.00	0.22	0.06			7.50	6.90	1.0
22	23.00	1.20	0.14	0.14	55.80	0.23	0.06			7.50	6.90	1.0
23	20.30	1.11	0.14	0.14	51.60	0.21	0.06			7.50	6.90	1.0
24	14.80	1.15	0.14	0.15	49.40	0.23	0.06			7.50	7.00	1.0
25	16.70	1.17	0.13	0.14	65.80	0.27	0.07			7.50	7.00	1.0
26	12.00	1.19	0.14	0.14	63.70	0.24	0.06			7.60	7.00	1.0
27	9.10	0.87	0.13	0.13	58.70	0.24	0.07			7.50	7.00	1.0
28	10.80	0.80	0.13	0.12	58.30	0.24	0.06			7.50	7.00	1.0
29	9.10	0.80	0.13	0.12	62.30	0.23	0.06			7.40	7.00	1.0
30	8.50	0.69	0.17	0.16	58.40	0.24	0.07			7.50	7.10	1.0
31	6.80	0.81	0.13	0.13	44.20	0.19	0.05			7.40	7.00	1.0

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.0: DISINFECTION SUMMARY

		1986						1985						1984						1983					
		PRE-CHLORINATION			POST CHLORINATION			PRE CHLORINATION			POST CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION			PRE CHLORINATION			POST CHLORINATION		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JAN	Cl2 Demand																								
	Cl2 Dosage	4.50	1.00	2.21	0.32	0.23	0.28	2.50	1.40	2.01	0.34	0.29	0.31	6.60	2.10	3.00	0.36	0.31	0.33						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.67	0.49	0.61	0.88	0.77	0.82	0.83	0.49	0.59	0.88	0.73	0.80	0.77	0.40	0.61	0.82	0.76	0.79						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
FEB	Cl2 Demand																								
	Cl2 Dosage	2.80	1.20	1.95	0.28	0.22	0.26	5.80	1.80	2.65	0.35	0.27	0.32	4.40	1.20	1.06	0.36	0.29	0.31						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.74	0.54	0.62	0.88	0.77	0.82	0.98	0.45	0.63	0.85	0.76	0.80	0.72	0.51	0.63	0.83	0.77	0.79						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
MAR	Cl2 Demand																								
	Cl2 Dosage	3.40	1.20	1.93	0.29	0.23	0.26	3.40	1.40	2.37	0.34	0.29	0.32	4.80	1.20	2.86	0.39	0.31	0.34						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.74	0.50	0.61	0.89	0.77	0.82	0.73	0.45	0.61	0.86	0.75	0.81	0.76	0.51	0.64	0.87	0.77	0.81						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.0: DISINFECTION SUMMARY

		1986						1985						1984						1983					
		PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
APR	Cl2 Demand																								
	Cl2 Dosage	3.60	1.20	1.88	0.28	0.23	0.26	4.60	1.00	1.96	0.34	0.23	0.29	3.10	0.27	0.80	0.40	0.31	0.34						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.78	0.52	0.62	0.86	0.77	0.82	0.74	0.46	0.62	0.90	0.75	0.81	0.80	0.46	0.63	0.84	0.76	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
MAY	Cl2 Demand																								
	Cl2 Dosage	3.50	1.10	1.92	0.27	0.15	0.24	2.40	1.00	1.68	0.31	0.18	0.25	2.70	0.99	1.75	0.34	0.22	0.28						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.71	0.45	0.60	0.91	0.79	0.83	0.70	0.53	0.60	0.89	0.76	0.81	0.76	0.55	0.65	0.82	0.74	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
JUN	Cl2 Demand																								
	Cl2 Dosage	4.00	1.30	2.27	0.27	0.21	0.23	3.10	1.40	1.97	0.37	0.18	0.23	2.60	1.00	1.64	0.28	0.21	0.25						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.71	0.44	0.59	0.96	0.76	0.82	0.74	0.50	0.60	0.93	0.76	0.82	0.70	0.54	0.61	0.85	0.75	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								

TABLE 3.0: DISINFECTION SUMMARY

		1986						1985						1984						1983					
		PRE CHLORINATION			POST-CHLORINATION			PRE CHLORINATION			POST CHLORINATION			PRE CHLORINATION			POST CHLORINATION			PRE CHLORINATION			POST CHLORINATION		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JUL	Cl2 Demand																								
	Cl2 Dosage	2.60	0.87	1.69	0.24	0.16	0.21	7.00	1.10	1.92	0.26	0.13	0.22	4.10	1.00	1.97	0.28	0.17	0.23						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.81	0.47	0.61	0.94	0.74	0.83	0.68	0.51	0.60	0.86	0.76	0.81	0.78	0.48	0.60	0.87	0.78	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
AUG	Cl2 Demand																								
	Cl2 Dosage	6.60	1.20	2.30	0.26	0.21	0.23	5.80	1.20	2.07	0.35	0.18	0.25	5.60	1.50	2.99	0.35	0.22	0.28						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	0.70	0.46	0.60	0.87	0.78	0.82	0.70	0.54	0.64	0.93	0.77	0.83	0.84	0.43	0.63	0.88	0.75	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
SEP	Cl2 Demand	3.30	1.20	2.01	0.30	0.22	0.26	3.40	1.10	2.09	0.32	0.23	0.27	3.30	1.70	2.55	0.34	0.28	0.32						
	Cl2 Dosage																								
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	1.30	0.57	0.87	1.16	0.78	0.94	0.77	0.55	0.64	0.89	0.74	0.82	0.81	0.56	0.64	0.87	0.76	0.82						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.0: DISINFECTION SUMMARY

		1986						1985						1984						1983					
		PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION			PRE-CHLORINATION			POST-CHLORINATION		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
OCT	Cl2 Demand																								
	Cl2 Dosage	3.90	1.20	2.40	0.32	0.26	0.30	3.20	1.00	1.89	0.38	0.26	0.29	5.20	1.80	2.59	0.37	0.19	0.34						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	1.24	0.68	0.88	1.16	0.69	0.84	0.69	0.52	0.62	0.92	0.75	0.82	0.73	0.37	0.61	0.86	0.75	0.80						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
NOV	Cl2 Demand																								
	Cl2 Dosage	3.70	1.80	2.63	0.37	0.28	0.33	4.00	1.50	2.39	0.31	0.28	0.30	4.80	0.34	1.79	0.38	0.29	0.33						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	1.16	0.65	0.87	1.16	0.84	0.99	0.80	0.51	0.63	1.02	0.71	0.83	0.77	0.55	0.64	0.90	0.75	0.81						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								
DEC	Cl2 Demand																								
	Cl2 Dosage	2.90	1.30	2.16	4.20	0.27	0.34	3.40	1.20	1.93	0.35	0.28	0.30	2.80	1.00	1.53	0.33	0.27	0.30						
	Ammonia																								
	SO2																								
	Resid. Cl2 Free	1.20	0.70	0.83	1.13	0.86	0.96	0.75	0.52	0.62	0.92	0.76	0.82	0.75	0.53	0.63	0.91	0.76	0.81						
	Resid. Cl2 Comb.																								
	Resid. Cl2 Total																								

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE JAN 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.20			0.58				0.32			0.79			1
2		2.50			0.47				0.32			0.76			2
3		3.10			0.65				0.32			0.79			3
4		2.70			0.71				0.35			0.81			4
5		2.20			0.65				0.33			0.79			5
6		2.60			0.58				0.35			0.79			6
7		2.60			0.62				0.34			0.79			7
8		2.30			0.65				0.35			0.81			8
9		2.10			0.60				0.33			0.81			9
10		2.70			0.63				0.34			0.81			10
11		3.10			0.62				0.31			0.80			11
12		3.50			0.68				0.32			0.79			12
13		2.30			0.61				0.36			0.80			13
14		2.50			0.59				0.33			0.80			14
15		2.70			0.66				0.36			0.77			15
16		2.10			0.59				0.32			0.81			16
17		4.20			0.48				0.33			0.78			17
18		6.60			0.41				0.32			0.76			18
19		3.10			0.53				0.34			0.79			19
20		4.10			0.53				0.33			0.78			20
21		3.30			0.66				0.33			0.80			21
22		2.50			0.65				0.32			0.81			22
23		2.60			0.58				0.33			0.80			23
24		2.80			0.68				0.33			0.78			24
25		3.50			0.40				0.34			0.81			25
26		3.60			0.66				0.34			0.82			26
27		3.60			0.69				0.35			0.79			27
28		2.90			0.77				0.32			0.80			28
29		2.20			0.66				0.36			0.79			29
30		4.10			0.68				0.32			0.79			30
31		2.80			0.67				0.31			0.79			31

TABLE 3.1: DISINFECTION PROFILE FEB 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.50			0.67				0.33			0.83			1
2		1.70			0.60				0.33			0.79			2
3		2.60			0.62				0.34			0.79			3
4		1.90			0.67				0.31			0.81			4
5		1.60			0.65				0.36			0.80			5
6		1.20			0.70				0.31			0.80			6
7		2.60			0.70				0.32			0.79			7
8		1.30			0.65				0.32			0.80			8
9		2.20			0.61				0.31			0.80			9
10		2.00			0.63				0.31			0.79			10
11		2.10			0.59				0.31			0.79			11
12		3.20			0.64				0.31			0.77			12
13		4.40			0.51				0.31			0.80			13
14		3.00			0.58				0.29			0.80			14
15		3.20			0.72				0.31			0.79			15
16		2.10			0.71				0.31			0.79			16
17		2.20			0.58				0.32			0.79			17
18		1.70			0.61				0.29			0.79			18
19		1.80			0.56				0.30			0.78			19
20		2.20			0.64				0.29			0.78			20
21		1.50			0.70				0.31			0.79			21
22		1.80			0.61				0.32			0.80			22
23		2.30			0.60				0.31			0.77			23
24		1.80			0.55				0.32			0.79			24
25		2.10			0.59				0.31			0.78			25
26		1.60			0.61				0.31			0.79			26
27		1.70			0.66				0.30			0.80			27
28		2.10			0.69				0.31			0.80			28
29		2.90			0.55				0.32			0.78			29
30															30
31															31

WATER PLANT OPTIMIZATION STUDY
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TABLE 3.1: DISINFECTION PROFILE MAR 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.90			0.70				0.32			0.80			1
2		1.90			0.69				0.33			0.83			2
3		2.40			0.54				0.32			0.77			3
4		3.80			0.60				0.32			0.78			4
5		4.30			0.60				0.31			0.77			5
6		4.40			0.57				0.31			0.81			6
7		4.60			0.67				0.33			0.83			7
8		3.50			0.67				0.34			0.83			8
9		2.80			0.68				0.34			0.80			9
10		1.80			0.65				0.35			0.79			10
11		2.60			0.51				0.37			0.81			11
12		2.80			0.57				0.34			0.80			12
13		3.20			0.72				0.35			0.81			13
14		2.50			0.73				0.34			0.81			14
15		2.50			0.66				0.35			0.79			15
16		2.40			0.59				0.36			0.79			16
17		4.80			0.52				0.37			0.78			17
18		3.80			0.58				0.35			0.82			18
19		3.70			0.73				0.34			0.83			19
20		2.70			0.68				0.36			0.78			20
21		3.10			0.54				0.35			0.81			21
22		3.90			0.71				0.35			0.86			22
23		4.00			0.75				0.36			0.87			23
24		2.20			0.67				0.32			0.79			24
25		2.60			0.61				0.34			0.80			25
26		2.60			0.74				0.39			0.83			26
27		1.80			0.66				0.36			0.81			27
28		1.80			0.71				0.34			0.80			28
29		1.50			0.76				0.38			0.83			29
30		1.20			0.54				0.35			0.79			30
31		1.70			0.58				0.32			0.79			31

TABLE 3.1: DISINFECTION PROFILE APR 1984

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.80			0.60				0.33			0.80			1
2		1.80			0.64				0.33			0.77			2
3		1.50			0.63				0.34			0.81			3
4		1.60			0.65				0.36			0.76			4
5		1.80			0.66				0.33			0.77			5
6		1.50			0.61				0.35			0.79			6
7		1.50			0.65				0.32			0.81			7
8		1.60			0.64				0.34			0.83			8
9		1.50			0.72				0.32			0.82			9
10		2.10			0.46				0.33			0.79			10
11		2.50			0.59				0.33			0.81			11
12		1.90			0.53				0.33			0.78			12
13		0.28			0.65				0.35			0.80			13
14		0.27			0.66				0.33			0.79			14
15		3.10			0.67				0.37			0.76			15
16		2.00			0.66				0.34			0.79			16
17		2.60			0.76				0.36			0.80			17
18		1.20			0.64				0.36			0.82			18
19		1.60			0.55				0.35			0.83			19
20		1.50			0.57				0.32			0.83			20
21		1.30			0.61				0.33			0.80			21
22		1.40			0.68				0.4			0.83			22
23		1.50			0.63				0.34			0.83			23
24		1.80			0.58				0.34			0.79			24
25		1.90			0.56				0.33			0.77			25
26		1.80			0.70				0.31			0.82			26
27		1.40			0.80				0.35			0.84			27
28		1.50			0.60				0.31			0.79			28
29		1.20			0.65				0.32			0.80			29
30		1.40			0.60				0.35			0.78			30
31															31

TABLE 3.1: DISINFECTION PROFILE MAY 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.50			0.67				0.33			0.80			1
2		1.00			0.76				0.28			0.80			2
3		1.50			0.65				0.29			0.80			3
4		1.30			0.60				0.27			0.79			4
5		1.20			0.63				0.24			0.80			5
6		1.50			0.69				0.29			0.82			6
7		1.20			0.66				0.24			0.82			7
8		1.40			0.62				0.30			0.81			8
9		1.90			0.60				0.30			0.79			9
10		1.40			0.65				0.29			0.80			10
11		1.30			0.61				0.27			0.82			11
12		1.30			0.59				0.25			0.80			12
13		1.30			0.68				0.26			0.80			13
14		2.00			0.74				0.26			0.82			14
15		0.99			0.72				0.26			0.81			15
16		1.70			0.64				0.27			0.79			16
17		1.90			0.55				0.25			0.80			17
18		2.40			0.66				0.27			0.81			18
19		1.90			0.62				0.25			0.78			19
20		1.80			0.63				0.29			0.76			20
21		1.90			0.67				0.25			0.79			21
22		1.50			0.66				0.29			0.82			22
23		2.50			0.64				0.30			0.82			23
24		2.30			0.62				0.33			0.79			24
25		2.60			0.64				0.33			0.79			25
26		2.10			0.64				0.27			0.80			26
27		2.10			0.64				0.31			0.81			27
28		2.10			0.68				0.32			0.81			28
29		2.70			0.65				0.34			0.80			29
30		1.90			0.65				0.28			0.81			30
31		2.00			0.59				0.22			0.74			31

TABLE 3.1: DISINFECTION PROFILE JUN 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.40			0.58				0.23			0.76			1
2		1.70			0.55				0.28			0.77			2
3		1.80			0.60				0.27			0.79			3
4		1.50			0.58				0.25			0.81			4
5		2.60			0.59				0.27			0.82			5
6		1.70			0.65				0.27			0.80			6
7		1.80			0.60				0.26			0.80			7
8		2.00			0.62				0.28			0.80			8
9		1.70			0.67				0.22			0.80			9
10		1.90			0.59				0.23			0.80			10
11		1.50			0.56				0.21			0.80			11
12		1.60			0.59				0.21			0.80			12
13		1.80			0.55				0.24			0.79			13
14		2.00			0.55				0.28			0.75			14
15		2.10			0.65				0.27			0.80			15
16		1.60			0.69				0.25			0.80			16
17		1.30			0.54				0.27			0.81			17
18		1.60			0.59				0.24			0.76			18
19		1.60			0.69				0.26			0.83			19
20		1.20			0.62				0.25			0.78			20
21		1.30			0.55				0.26			0.80			21
22		1.50			0.70				0.24			0.81			22
23		1.40			0.68				0.27			0.80			23
24		1.00			0.61				0.25			0.77			24
25		1.40			0.63				0.24			0.81			25
26		1.50			0.63				0.22			0.82			26
27		1.70			0.61				0.26			0.81			27
28		1.60			0.59				0.21			0.80			28
29		1.40			0.66				0.24			0.85			29
30		1.90			0.66				0.24			0.79			30
31															31

TABLE 3.1: DISINFECTION PROFILE MAY 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.50			0.67				0.33			0.80			1
2		1.00			0.76				0.28			0.80			2
3		1.50			0.65				0.29			0.80			3
4		1.30			0.60				0.27			0.79			4
5		1.20			0.63				0.24			0.80			5
6		1.50			0.69				0.29			0.82			6
7		1.20			0.66				0.24			0.82			7
8		1.40			0.62				0.30			0.81			8
9		1.90			0.60				0.30			0.79			9
10		1.40			0.65				0.29			0.80			10
11		1.30			0.61				0.27			0.82			11
12		1.30			0.59				0.25			0.80			12
13		1.30			0.68				0.26			0.80			13
14		2.00			0.74				0.26			0.82			14
15		0.99			0.72				0.26			0.81			15
16		1.70			0.64				0.27			0.79			16
17		1.90			0.55				0.25			0.80			17
18		2.40			0.66				0.27			0.81			18
19		1.90			0.62				0.25			0.78			19
20		1.80			0.63				0.29			0.76			20
21		1.90			0.67				0.25			0.79			21
22		1.50			0.66				0.29			0.82			22
23		2.50			0.64				0.30			0.82			23
24		2.30			0.62				0.33			0.79			24
25		2.60			0.64				0.33			0.79			25
26		2.10			0.64				0.27			0.80			26
27		2.10			0.64				0.31			0.81			27
28		2.10			0.68				0.32			0.81			28
29		2.70			0.65				0.34			0.80			29
30		1.90			0.65				0.28			0.81			30
31		2.00			0.59				0.22			0.74			31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE JUN 1984

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.40			0.58				0.23			0.76			1
2		1.70			0.55				0.28			0.77			2
3		1.80			0.60				0.27			0.79			3
4		1.50			0.58				0.25			0.81			4
5		2.60			0.59				0.27			0.82			5
6		1.70			0.65				0.27			0.80			6
7		1.80			0.60				0.26			0.80			7
8		2.00			0.62				0.28			0.80			8
9		1.70			0.67				0.22			0.80			9
10		1.90			0.59				0.23			0.80			10
11		1.50			0.56				0.21			0.80			11
12		1.60			0.59				0.21			0.80			12
13		1.80			0.55				0.24			0.79			13
14		2.00			0.55				0.28			0.75			14
15		2.10			0.65				0.27			0.80			15
16		1.60			0.69				0.25			0.80			16
17		1.30			0.54				0.27			0.81			17
18		1.60			0.59				0.24			0.76			18
19		1.60			0.69				0.26			0.83			19
20		1.20			0.62				0.25			0.78			20
21		1.30			0.55				0.26			0.80			21
22		1.50			0.70				0.24			0.81			22
23		1.40			0.68				0.27			0.80			23
24		1.00			0.61				0.25			0.77			24
25		1.40			0.63				0.24			0.81			25
26		1.50			0.63				0.22			0.82			26
27		1.70			0.61				0.26			0.81			27
28		1.60			0.59				0.21			0.80			28
29		1.40			0.66				0.24			0.85			29
30		1.90			0.66				0.24			0.79			30
31															31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE JUL 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.50			0.69				0.23			0.79			1
2		1.50			0.62				0.21			0.79			2
3		1.60			0.58				0.21			0.80			3
4		1.70			0.58				0.22			0.79			4
5		1.70			0.56				0.25			0.79			5
6		2.10			0.69				0.27			0.81			6
7		1.40			0.60				0.27			0.83			7
8		1.50			0.54				0.26			0.79			8
9		1.80			0.64				0.27			0.79			9
10		1.60			0.57				0.24			0.83			10
11		1.30			0.62				0.28			0.80			11
12		1.00			0.60				0.22			0.80			12
13		1.30			0.58				0.21			0.79			13
14		1.20			0.51				0.21			0.78			14
15		1.50			0.50				0.24			0.80			15
16		1.60			0.52				0.21			0.80			16
17		1.80			0.62				0.27			0.80			17
18		1.80			0.71				0.28			0.80			18
19		1.70			0.62				0.25			0.81			19
20		3.00			0.49				0.22			0.80			20
21		1.90			0.59				0.21			0.79			21
22		1.80			0.48				0.20			0.81			22
23		2.00			0.55				0.20			0.80			23
24		2.20			0.51				0.19			0.79			24
25		2.30			0.64				0.20			0.87			25
26		2.50			0.58				0.24			0.81			26
27		3.60			0.65				0.17			0.85			27
28		4.10			0.63				0.25			0.80			28
29		3.10			0.67				0.27			0.79			29
30		2.00			0.78				0.24			0.78			30
31		3.10			0.57				0.22			0.81			31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE AUG 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		3.60			0.63				0.24			0.80			1
2		4.30			0.58				0.23			0.78			2
3		5.60			0.68				0.32			0.85			3
4		4.30			0.66				0.31			0.79			4
5		3.00			0.69				0.30			0.78			5
6		2.70			0.64				0.26			0.79			6
7		2.70			0.51				0.27			0.79			7
8		3.00			0.64				0.30			0.77			8
9		2.90			0.70				0.29			0.79			9
10		5.40			0.76				0.28			0.88			10
11		4.50			0.43				0.27			0.80			11
12		5.00			0.52				0.30			0.85			12
13		3.80			0.71				0.27			0.88			13
14		1.50			0.51				0.27			0.80			14
15		1.70			0.84				0.27			0.78			15
16		2.30			0.50				0.26			0.81			16
17		1.70			0.57				0.22			0.78			17
18		2.20			0.65				0.28			0.79			18
19		3.70			0.61				0.32			0.80			19
20		3.30			0.59				0.30			0.77			20
21		3.00			0.56				0.30			0.82			21
22		1.80			0.65				0.29			0.75			22
23		2.40			0.60				0.30			0.77			23
24		2.10			0.71				0.29			0.77			24
25		2.90			0.74				0.27			0.87			25
26		2.10			0.74				0.28			0.78			26
27		2.20			0.64				0.27			0.78			27
28		2.90			0.61				0.30			0.79			28
29		2.10			0.61				0.29			0.81			29
30		2.00			0.60				0.35			0.77			30
31		2.10			0.61				0.29			0.82			31

TABLE 3.1: DISINFECTION PROFILE SEP 1984

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.50			0.69				0.30			0.82			1
2		1.90			0.60				0.28			0.80			2
3		3.10			0.66				0.30			0.81			3
4		2.60			0.65				0.30			0.82			4
5		1.80			0.64				0.29			0.84			5
6		1.80			0.57				0.31			0.84			6
7		2.60			0.63				0.33			0.81			7
8		3.30			0.64				0.30			0.78			8
9		2.60			0.68				0.33			0.82			9
10		3.20			0.71				0.32			0.80			10
11		3.20			0.61				0.32			0.80			11
12		3.20			0.66				0.32			0.86			12
13		3.10			0.73				0.31			0.87			13
14		3.00			0.61				0.34			0.84			14
15		2.50			0.66				0.31			0.84			15
16		2.50			0.57				0.33			0.80			16
17		2.20			0.68				0.33			0.83			17
18		2.50			0.64				0.32			0.80			18
19		2.50			0.64				0.31			0.81			19
20		2.70			0.64				0.31			0.80			20
21		2.70			0.56				0.30			0.81			21
22		1.70			0.63				0.30			0.79			22
23		2.20			0.65				0.33			0.80			23
24		2.40			0.61				0.31			0.76			24
25		2.60			0.63				0.33			0.80			25
26		2.60			0.56				0.33			0.81			26
27		2.60			0.81				0.32			0.82			27
28		2.30			0.58				0.34			0.84			28
29		2.20			0.66				0.34			0.87			29
30		2.30			0.57				0.34			0.87			30
31															31

TABLE 3.1: DISINFECTION PROFILE OCT 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.20			0.61				0.31			0.80			1
2		2.50			0.65				0.31			0.83			2
3		2.30			0.68				0.28			0.81			3
4		3.10			0.73				0.19			0.81			4
5		3.80			0.55				0.35			0.78			5
6		3.80			0.56				0.30			0.75			6
7		5.20			0.37				0.37			0.77			7
8		3.80			0.53				0.33			0.82			8
9		3.40			0.70				0.33			0.80			9
10		1.90			0.73				0.34			0.78			10
11		2.30			0.66				0.35			0.82			11
12		2.30			0.67				0.34			0.81			12
13		1.90			0.52				0.34			0.82			13
14		2.70			0.53				0.35			0.80			14
15		2.40			0.66				0.36			0.82			15
16		2.40			0.54				0.36			0.77			16
17		2.70			0.61				0.35			0.76			17
18		2.50			0.61				0.35			0.81			18
19		2.50			0.63				0.35			0.83			19
20		2.50			0.64				0.32			0.80			20
21		2.50			0.71				0.37			0.81			21
22		2.30			0.54				0.34			0.79			22
23		2.20			0.67				0.35			0.83			23
24		2.00			0.65				0.36			0.85			24
25		2.00			0.67				0.36			0.86			25
26		1.80			0.61				0.36			0.80			26
27		1.90			0.62				0.33			0.78			27
28		1.90			0.65				0.33			0.79			28
29		2.60			0.70				0.34			0.86			29
30		2.00			0.56				0.35			0.80			30
31		2.80			0.45				0.35			0.76			31

TABLE 3.1: DISINFECTION PROFILE NOV 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		3.30			0.69				0.36			0.83			1
2		4.80			0.59				0.36			0.80			2
3		1.90			0.73				0.34			0.90			3
4		1.90			0.66				0.38			0.79			4
5		1.60			0.64				0.34			0.75			5
6		1.60			0.69				0.35			0.78			6
7		1.50			0.66				0.35			0.84			7
8		2.20			0.61				0.34			0.77			8
9		1.40			0.58				0.35			0.80			9
10		1.80			0.59				0.33			0.75			10
11		0.34			0.63				0.34			0.79			11
12		2.00			0.58				0.32			0.81			12
13		1.60			0.67				0.34			0.83			13
14		1.70			0.66				0.33			0.79			14
15		1.60			0.67				0.35			0.82			15
16		2.20			0.56				0.32			0.79			16
17		1.70			0.77				0.34			0.84			17
18		1.50			0.56				0.32			0.81			18
19		1.50			0.67				0.33			0.84			19
20		1.60			0.71				0.31			0.81			20
21		1.20			0.64				0.30			0.78			21
22		1.80			0.55				0.29			0.84			22
23		2.40			0.62				0.31			0.83			23
24		1.40			0.72				0.30			0.80			24
25		1.80			0.67				0.32			0.79			25
26		1.20			0.67				0.31			0.79			26
27		1.40			0.65				0.30			0.80			27
28		1.60			0.64				0.34			0.81			28
29		1.70			0.63				0.35			0.81			29
30		1.50			0.61				0.33			0.81			30
31															31

TABLE 3.1: DISINFECTION PROFILE DEC 1984

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.10			0.61				0.32			0.82			1
2		1.60			0.69				0.32			0.81			2
3		1.50			0.67				0.32			0.91			3
4		1.00			0.53				0.30			0.80			4
5		1.30			0.61				0.31			0.78			5
6		1.10			0.65				0.29			0.77			6
7		1.10			0.63				0.28			0.80			7
8		1.20			0.58				0.29			0.76			8
9		1.20			0.70				0.33			0.78			9
10		1.40			0.57				0.29			0.82			10
11		1.20			0.56				0.30			0.78			11
12		1.40			0.59				0.29			0.83			12
13		1.20			0.61				0.30			0.80			13
14		1.90			0.60				0.31			0.83			14
15		1.20			0.61				0.29			0.79			15
16		1.50			0.67				0.30			0.82			16
17		1.40			0.56				0.27			0.82			17
18		1.90			0.56				0.30			0.80			18
19		1.50			0.66				0.32			0.83			19
20		1.80			0.66				0.31			0.83			20
21		1.60			0.75				0.30			0.86			21
22		1.40			0.56				0.28			0.80			22
23		2.80			0.63				0.30			0.83			23
24		1.90			0.73				0.29			0.83			24
25		1.70			0.70				0.32			0.81			25
26		1.90			0.72				0.30			0.81			26
27		1.40			0.64				0.30			0.79			27
28		1.30			0.57				0.28			0.79			28
29		1.80			0.61				0.27			0.78			29
30		2.30			0.63				0.28			0.79			30
31		1.70			0.70				0.29			0.82			31

TABLE 3.1: DISINFECTION PROFILE JAN 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.00			0.61				0.31			0.84			1
2		2.30			0.61				0.29			0.81			2
3		2.50			0.83				0.32			0.81			3
4		1.70			0.67				0.30			0.83			4
5		1.50			0.56				0.30			0.78			5
6		2.00			0.53				0.31			0.79			6
7		1.50			0.50				0.31			0.77			7
8		1.80			0.54				0.33			0.73			8
9		2.20			0.49				0.33			0.77			9
10		2.30			0.65				0.32			0.84			10
11		2.20			0.56				0.32			0.76			11
12		1.50			0.62				0.30			0.80			12
13		1.90			0.58				0.32			0.73			13
14		2.20			0.55				0.30			0.75			14
15		2.20			0.65				0.31			0.79			15
16		2.30			0.54				0.32			0.83			16
17		1.80			0.65				0.32			0.83			17
18		1.70			0.53				0.32			0.78			18
19		2.20			0.64				0.30			0.80			19
20		2.10			0.77				0.32			0.85			20
21		1.40			0.56				0.33			0.78			21
22		2.00			0.52				0.30			0.75			22
23		2.10			0.59				0.33			0.83			23
24		2.00			0.59				0.34			0.83			24
25		1.80			0.58				0.31			0.83			25
26		2.40			0.59				0.31			0.80			26
27		1.50			0.61				0.33			0.81			27
28		2.10			0.57				0.30			0.76			28
29		2.50			0.56				0.32			0.83			29
30		2.20			0.59				0.32			0.86			30
31		2.30			0.59				0.32			0.88			31

TABLE 3.1: DISINFECTION PROFILE FEB 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.20			0.69				0.33			0.82			1
2		2.20			0.66				0.30			0.80			2
3		2.10			0.66				0.33			0.81			3
4		1.80			0.54				0.31			0.78			4
5		2.20			0.49				0.31			0.77			5
6		2.20			0.69				0.32			0.78			6
7		2.00			0.68				0.32			0.82			7
8		1.80			0.64				0.31			0.81			8
9		1.90			0.53				0.27			0.78			9
10		2.30			0.45				0.30			0.80			10
11		1.80			0.63				0.30			0.80			11
12		2.20			0.57				0.32			0.79			12
13		2.80			0.66				0.31			0.81			13
14		3.30			0.66				0.31			0.80			14
15		2.50			0.71				0.34			0.81			15
16		3.00			0.69				0.33			0.84			16
17		2.50			0.65				0.35			0.82			17
18		2.00			0.64				0.32			0.80			18
19		2.40			0.65				0.33			0.80			19
20		3.50			0.58				0.33			0.81			20
21		2.20			0.62				0.33			0.76			21
22		2.40			0.55				0.34			0.80			22
23		2.30			0.56				0.31			0.79			23
24		5.80			0.98				0.32			0.79			24
25		4.60			0.54				0.32			0.80			25
26		4.60			0.62				0.33			0.85			26
27		2.90			0.64				0.32			0.82			27
28		2.80			0.61				0.35			0.82			28
29															29
30															30
31															31

TABLE 3.1: DISINFECTION PROFILE MAR 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.60			0.58				0.33			0.80			1
2		2.30			0.69				0.31			0.86			2
3		2.40			0.70				0.31			0.83			3
4		2.00			0.55				0.31			0.86			4
5		3.00			0.51				0.33			0.81			5
6		2.00			0.52				0.33			0.85			6
7		2.20			0.59				0.31			0.79			7
8		3.30			0.73				0.32			0.86			8
9		1.40			0.48				0.29			0.79			9
10		2.50			0.65				0.31			0.81			10
11		2.30			0.66				0.31			0.80			11
12		2.60			0.70				0.32			0.78			12
13		1.60			0.64				0.31			0.77			13
14		2.00			0.58				0.33			0.82			14
15		2.00			0.69				0.32			0.83			15
16		1.90			0.51				0.30			0.84			16
17		2.30			0.45				0.31			0.79			17
18		2.80			0.59				0.31			0.82			18
19		2.80			0.59				0.30			0.83			19
20		3.10			0.49				0.33			0.75			20
21		3.40			0.59				0.32			0.76			21
22		2.60			0.63				0.32			0.83			22
23		3.10			0.62				0.30			0.82			23
24		2.40			0.61				0.32			0.78			24
25		2.30			0.64				0.31			0.80			25
26		1.80			0.59				0.33			0.77			26
27		2.20			0.64				0.33			0.78			27
28		2.30			0.59				0.34			0.80			28
29		2.10			0.57				0.31			0.80			29
30		2.50			0.67				0.31			0.84			30
31		1.70			0.73				0.31			0.80			31

TABLE 3.1: DISINFECTION PROFILE APR 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.70			0.53				0.31			0.80			1
2		2.40			0.65				0.32			0.77			2
3		1.50			0.57				0.34			0.83			3
4		2.00			0.64				0.30			0.81			4
5		1.50			0.56				0.32			0.81			5
6		1.80			0.58				0.32			0.82			6
7		1.80			0.60				0.31			0.82			7
8		1.80			0.66				0.32			0.83			8
9		4.60			0.55				0.30			0.81			9
10		2.10			0.46				0.31			0.76			10
11		2.30			0.57				0.31			0.79			11
12		2.50			0.74				0.29			0.85			12
13		1.90			0.56				0.30			0.85			13
14		2.00			0.61				0.30			0.79			14
15		2.10			0.60				0.27			0.80			15
16		1.90			0.72				0.29			0.90			16
17		1.90			0.63				0.31			0.80			17
18		1.60			0.60				0.29			0.78			18
19		2.40			0.57				0.31			0.75			19
20		1.80			0.69				0.27			0.82			20
21		2.20			0.70				0.28			0.87			21
22		1.50			0.70				0.27			0.85			22
23		1.00			0.59				0.23			0.79			23
24		2.00			0.59				0.31			0.80			24
25		2.20			0.67				0.28			0.83			25
26		2.40			0.58				0.26			0.80			26
27		1.60			0.66				0.28			0.77			27
28		1.00			0.65				0.28			0.84			28
29		1.50			0.64				0.27			0.79			29
30		1.70			0.58				0.29			0.82			30
31															31

TABLE 3.1: DISINFECTION PROFILE MAY 1985

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.10			0.57				0.31			0.79			1
2		1.90			0.59				0.28			0.81			2
3		1.80			0.62				0.26			0.80			3
4		1.80			0.56				0.26			0.82			4
5		1.80			0.60				0.26			0.79			5
6		2.20			0.53				0.28			0.79			6
7		2.10			0.70				0.26			0.79			7
8		2.00			0.63				0.25			0.82			8
9		1.70			0.63				0.24			0.83			9
10		1.30			0.59				0.22			0.79			10
11		1.50			0.56				0.20			0.82			11
12		1.60			0.65				0.22			0.81			12
13		1.60			0.59				0.22			0.84			13
14		1.50			0.53				0.23			0.78			14
15		2.10			0.60				0.26			0.81			15
16		1.90			0.61				0.27			0.89			16
17		1.80			0.58				0.28			0.87			17
18		1.50			0.65				0.27			0.81			18
19		1.40			0.60				0.25			0.80			19
20		1.70			0.57				0.24			0.79			20
21		1.70			0.59				0.24			0.84			21
22		1.50			0.70				0.26			0.87			22
23		1.30			0.60				0.23			0.85			23
24		1.40			0.66				0.21			0.76			24
25		1.00			0.58				0.18			0.80			25
26		1.70			0.64				0.20			0.81			26
27		1.80			0.56				0.25			0.77			27
28		1.80			0.61				0.26			0.81			28
29		2.40			0.58				0.26			0.77			29
30		1.60			0.68				0.27			0.79			30
31		1.50			0.54				0.27			0.79			31

WATER PLANT OPTIMIZATION STUDY
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TABLE 3.1: DISINFECTION PROFILE JUN 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.70			0.68				0.21			0.78			1
2		1.80			0.62				0.22			0.81			2
3		1.70			0.61				0.24			0.91			3
4		1.90			0.56				0.24			0.81			4
5		1.50			0.60				0.22			0.81			5
6		2.20			0.50				0.21			0.76			6
7		1.90			0.63				0.20			0.81			7
8		1.90			0.56				0.18			0.78			8
9		2.20			0.64				0.18			0.84			9
10		2.40			0.54				0.18			0.78			10
11		3.10			0.66				0.28			0.80			11
12		2.50			0.54				0.28			0.78			12
13		2.40			0.66				0.27			0.82			13
14		1.90			0.60				0.25			0.82			14
15		2.10			0.57				0.27			0.82			15
16		1.90			0.62				0.27			0.79			16
17		2.10			0.58				0.27			0.86			17
18		2.80			0.57				0.37			0.83			18
19		2.70			0.65				0.29			0.93			19
20		2.10			0.69				0.26			0.87			20
21		1.70			0.63				0.20			0.84			21
22		2.10			0.62				0.26			0.86			22
23		1.70			0.58				0.25			0.85			23
24		1.50			0.56				0.21			0.84			24
25		1.70			0.74				0.20			0.86			25
26		1.70			0.56				0.21			0.83			26
27		1.40			0.61				0.20			0.84			27
28		1.40			0.54				0.20			0.80			28
29		1.40			0.59				0.20			0.78			29
30		1.70			0.53				0.21			0.78			30
31															31

TABLE 3.1: DISINFECTION PROFILE JUL 1985

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.60			0.58				0.22			0.77			1
2		2.00			0.61				0.24			0.79			2
3		1.60			0.61				0.23			0.81			3
4		1.10			0.57				0.23			0.79			4
5		1.70			0.62				0.25			0.78			5
6		1.40			0.54				0.25			0.80			6
7		1.40			0.65				0.24			0.78			7
8		1.30			0.53				0.19			0.80			8
9		1.40			0.66				0.20			0.82			9
10		1.10			0.58				0.25			0.80			10
11		1.40			0.67				0.23			0.82			11
12		1.60			0.51				0.21			0.79			12
13		7.00			0.60				0.19			0.80			13
14		1.30			0.63				0.26			0.82			14
15		1.70			0.52				0.26			0.82			15
16		1.70			0.68				0.26			0.84			16
17		1.50			0.56				0.25			0.83			17
18		1.70			0.66				0.24			0.84			18
19		1.60			0.56				0.24			0.84			19
20		1.80			0.62				0.21			0.81			20
21		2.00			0.57				0.25			0.77			21
22		1.60			0.63				0.23			0.83			22
23		1.90			0.54				0.23			0.82			23
24		2.00			0.65				0.20			0.86			24
25		1.80			0.63				0.19			0.80			25
26		2.30			0.60				0.22			0.76			26
27		2.20			0.51				0.20			0.80			27
28		2.20			0.58				0.19			0.83			28
29		2.30			0.68				0.13			0.79			29
30		2.60			0.67				0.20			0.79			30
31		2.80			0.61				0.24			0.83			31

TABLE 3.1: DISINFECTION PROFILE AUG 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		3.40			0.67				0.35			0.86			1
2		2.50			0.69				0.20			0.84			2
3		2.50			0.65				0.18			0.79			3
4		2.40			0.56				0.18			0.77			4
5		5.80			0.54				0.22			0.78			5
6		2.60			0.65				0.23			0.84			6
7		4.70			0.70				0.24			0.81			7
8		2.60			0.66				0.23			0.80			8
9		2.20			0.66				0.22			0.84			9
10		2.60			0.63				0.23			0.83			10
11		2.20			0.69				0.24			0.83			11
12		1.80			0.62				0.23			0.83			12
13		2.20			0.63				0.25			0.85			13
14		1.20			0.65				0.26			0.84			14
15		1.80			0.65				0.28			0.78			15
16		1.60			0.63				0.28			0.86			16
17		1.40			0.68				0.26			0.93			17
18		1.50			0.66				0.27			0.84			18
19		1.80			0.60				0.27			0.79			19
20		1.50			0.65				0.27			0.83			20
21		1.40			0.68				0.27			0.88			21
22		1.20			0.59				0.26			0.80			22
23		1.40			0.60				0.27			0.81			23
24		1.60			0.61				0.28			0.81			24
25		1.50			0.60				0.29			0.85			25
26		1.30			0.62				0.29			0.82			26
27		1.40			0.59				0.28			0.81			27
28		1.80			0.63				0.25			0.84			28
29		1.40			0.65				0.26			0.82			29
30		1.50			0.64				0.25			0.84			30
31		1.30			0.65				0.26			0.84			31

TABLE 3.1: DISINFECTION PROFILE SEP 1985

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.50			0.61				0.25			0.85			1
2		1.30			0.63				0.25			0.84			2
3		1.70			0.77				0.25			0.89			3
4		1.30			0.64				0.24			0.82			4
5		1.10			0.57				0.24			0.81			5
6		1.30			0.61				0.26			0.82			6
7		1.30			0.69				0.23			0.81			7
8		1.30			0.72				0.25			0.81			8
9		1.30			0.57				0.26			0.74			9
10		1.70			0.63				0.27			0.81			10
11		2.20			0.71				0.27			0.83			11
12		2.50			0.64				0.27			0.84			12
13		2.20			0.65				0.28			0.82			13
14		1.40			0.68				0.26			0.86			14
15		1.60			0.68				0.28			0.84			15
16		1.70			0.63				0.26			0.81			16
17		2.20			0.55				0.27			0.80			17
18		1.70			0.61				0.26			0.85			18
19		2.70			0.57				0.26			0.81			19
20		2.10			0.63				0.26			0.83			20
21		2.30			0.62				0.26			0.84			21
22		2.90			0.62				0.26			0.85			22
23		2.60			0.67				0.26			0.80			23
24		2.90			0.56				0.29			0.76			24
25		3.10			0.65				0.32			0.79			25
26		3.40			0.68				0.29			0.85			26
27		2.90			0.66				0.29			0.79			27
28		3.10			0.64				0.27			0.80			28
29		2.90			0.61				0.27			0.84			29
30		2.60			0.60				0.29			0.85			30
31															31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE OCT 1985

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.80			0.54				0.29			0.84			1
2		3.20			0.59				0.38			0.81			2
3		2.80			0.61				0.28			0.83			3
4		2.80			0.63				0.27			0.85			4
5		2.60			0.61				0.29			0.79			5
6		2.80			0.64				0.27			0.80			6
7		2.70			0.61				0.26			0.84			7
8		2.90			0.65				0.29			0.86			8
9		1.60			0.63				0.28			0.83			9
10		2.20			0.66				0.29			0.83			10
11		1.70			0.57				0.33			0.92			11
12		1.80			0.65				0.28			0.84			12
13		1.20			0.58				0.30			0.83			13
14		1.80			0.64				0.28			0.82			14
15		1.20			0.52				0.28			0.82			15
16		1.70			0.63				0.29			0.83			16
17		1.30			0.67				0.28			0.85			17
18		1.60			0.64				0.30			0.84			18
19		1.60			0.54				0.29			0.75			19
20		1.50			0.64				0.29			0.83			20
21		1.60			0.63				0.29			0.82			21
22		1.50			0.57				0.29			0.78			22
23		1.00			0.60				0.29			0.79			23
24		1.90			0.63				0.29			0.81			24
25		1.30			0.64				0.27			0.77			25
26		1.90			0.69				0.29			0.82			26
27		1.30			0.61				0.29			0.82			27
28		1.50			0.66				0.28			0.81			28
29		1.30			0.67				0.28			0.82			29
30		2.00			0.69				0.31			0.85			30
31		1.60			0.60				0.29			0.85			31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE NOV 1985

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.50			0.63				0.29			0.81			1
2		1.60			0.62				0.29			0.80			2
3		2.30			0.52				0.30			0.81			3
4		2.30			0.55				0.30			0.78			4
5		2.30			0.72				0.30			0.87			5
6		1.80			0.65				0.28			0.88			6
7		1.90			0.61				0.30			0.82			7
8		1.70			0.56				0.30			0.82			8
9		2.30			0.57				0.30			0.84			9
10		1.90			0.51				0.29			0.81			10
11		3.50			0.65				0.30			0.80			11
12		2.90			0.80				0.31			1.02			12
13		2.30			0.63				0.29			0.85			13
14		1.90			0.64				0.29			0.81			14
15		2.20			0.61				0.29			0.71			15
16		2.70			0.78				0.31			0.83			16
17		2.00			0.58				0.31			0.84			17
18		4.00			0.68				0.31			0.82			18
19		1.90			0.61				0.31			0.78			19
20		2.80			0.60				0.31			0.80			20
21		2.90			0.66				0.29			0.87			21
22		2.14			0.69				0.31			0.88			22
23		2.60			0.64				0.30			0.83			23
24		3.10			0.66				0.30			0.92			24
25		2.50			0.64				0.28			0.82			25
26		2.40			0.60				0.30			0.82			26
27		3.20			0.55				0.29			0.83			27
28		3.40			0.63				0.30			0.82			28
29		1.70			0.62				0.31			0.81			29
30		1.90			0.60				0.30			0.81			30
31															31

TABLE 3.1: DISINFECTION PROFILE DEC 1985

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.00			0.54				0.30			0.77			1
2		2.60			0.61				0.29			0.81			2
3		1.40			0.67				0.33			0.81			3
4		1.60			0.65				0.31			0.83			4
5		1.20			0.58				0.29			0.87			5
6		1.60			0.67				0.31			0.82			6
7		1.20			0.64				0.29			0.84			7
8		2.00			0.52				0.31			0.78			8
9		1.60			0.58				0.29			0.80			9
10		2.70			0.62				0.35			0.85			10
11		2.00			0.59				0.31			0.82			11
12		2.00			0.57				0.30			0.82			12
13		1.60			0.56				0.30			0.76			13
14		1.90			0.59				0.29			0.83			14
15		2.00			0.68				0.30			0.84			15
16		1.60			0.75				0.28			0.86			16
17		1.70			0.66				0.29			0.92			17
18		1.50			0.66				0.29			0.86			18
19		1.70			0.63				0.29			0.80			19
20		1.40			0.59				0.29			0.83			20
21		1.90			0.60				0.28			0.88			21
22		1.80			0.59				0.28			0.85			22
23		2.00			0.55				0.30			0.78			23
24		2.50			0.60				0.28			0.79			24
25		3.40			0.67				0.35			0.81			25
26		1.90			0.62				0.29			0.83			26
27		2.00			0.62				0.30			0.82			27
28		1.90			0.61				0.31			0.81			28
29		2.10			0.61				0.29			0.80			29
30		2.60			0.61				0.29			0.83			30
31		2.30			0.66				0.29			0.84			31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE JAN 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.00			0.61				0.31			0.79			1
2		2.30			0.58				0.30			0.78			2
3		2.80			0.60				0.31			0.83			3
4		2.20			0.62				0.29			0.83			4
5		2.50			0.62				0.32			0.83			5
6		2.20			0.59				0.28			0.82			6
7		2.40			0.62				0.30			0.83			7
8		2.10			0.58				0.31			0.82			8
9		2.10			0.62				0.28			0.80			9
10		2.60			0.50				0.29			0.77			10
11		1.80			0.60				0.27			0.83			11
12		2.20			0.61				0.28			0.82			12
13		2.10			0.63				0.27			0.82			13
14		2.00			0.59				0.29			0.79			14
15		2.20			0.61				0.29			0.86			15
16		2.00			0.61				0.28			0.79			16
17		1.90			0.64				0.25			0.82			17
18		2.10			0.54				0.23			0.82			18
19		2.90			0.64				0.28			0.88			19
20		2.40			0.49				0.27			0.79			20
21		4.50			0.60				0.29			0.79			21
22		2.30			0.65				0.27			0.84			22
23		2.10			0.67				0.27			0.83			23
24		2.90			0.63				0.25			0.81			24
25		2.30			0.63				0.25			0.83			25
26		2.00			0.63				0.25			0.85			26
27		1.40			0.63				0.23			0.84			27
28		1.80			0.61				0.24			0.81			28
29		1.90			0.61				0.27			0.83			29
30		1.60			0.58				0.25			0.78			30
31		1.00			0.66				0.27			0.85			31

TABLE 3.1: DISINFECTION PROFILE FEB 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.70			0.61				0.25			0.78			1
2		1.80			0.54				0.27			0.80			2
3		2.30			0.65				0.25			0.85			3
4		1.90			0.64				0.27			0.81			4
5		1.70			0.61				0.26			0.78			5
6		2.10			0.65				0.27			0.78			6
7		1.80			0.58				0.27			0.84			7
8		2.00			0.62				0.27			0.83			8
9		2.10			0.62				0.27			0.83			9
10		2.00			0.56				0.26			0.79			10
11		2.10			0.64				0.27			0.84			11
12		1.90			0.61				0.25			0.82			12
13		1.90			0.60				0.24			0.86			13
14		1.90			0.65				0.22			0.87			14
15		1.50			0.63				0.25			0.82			15
16		1.90			0.68				0.24			0.81			16
17		1.60			0.59				0.26			0.80			17
18		2.00			0.63				0.25			0.84			18
19		2.20			0.57				0.26			0.82			19
20		2.40			0.61				0.28			0.82			20
21		2.80			0.66				0.26			0.81			21
22		2.70			0.74				0.28			0.88			22
23		1.90			0.58				0.27			0.82			23
24		1.20			0.65				0.27			0.78			24
25		1.80			0.62				0.27			0.80			25
26		1.80			0.62				0.28			0.85			26
27		1.70			0.62				0.25			0.77			27
28		2.00			0.63				0.27			0.82			28
29															29
30															30
31															31

TABLE 3.1: DISINFECTION PROFILE MAR 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.40			0.65				0.25			0.82			1
2		1.60			0.70				0.25			0.82			2
3		1.50			0.64				0.25			0.80			3
4		2.10			0.58				0.27			0.77			4
5		1.80			0.57				0.26			0.80			5
6		2.40			0.57				0.26			0.83			6
7		3.10			0.74				0.26			0.81			7
8		1.30			0.62				0.27			0.80			8
9		2.00			0.58				0.28			0.78			9
10		1.60			0.60				0.26			0.79			10
11		3.40			0.62				0.28			0.79			11
12		2.50			0.68				0.29			0.86			12
13		1.70			0.63				0.29			0.82			13
14		2.30			0.56				0.29			0.79			14
15		1.90			0.64				0.26			0.87			15
16		1.30			0.58				0.23			0.82			16
17		1.60			0.56				0.23			0.80			17
18		2.40			0.55				0.29			0.84			18
19		2.20			0.56				0.27			0.83			19
20		2.60			0.64				0.28			0.84			20
21		1.90			0.64				0.26			0.85			21
22		1.60			0.56				0.26			0.85			22
23		1.60			0.56				0.26			0.82			23
24		1.20			0.60				0.25			0.79			24
25		1.60			0.58				0.28			0.89			25
26		2.10			0.64				0.26			0.82			26
27		1.80			0.63				0.25			0.82			27
28		1.80			0.73				0.24			0.84			28
29		1.80			0.62				0.24			0.83			29
30		1.80			0.50				0.24			0.81			30
31		1.80			0.64				0.25			0.81			31

TABLE 3.1: DISINFECTION PROFILE APR 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.90			0.71				0.26			0.82			1
2		1.30			0.63				0.25			0.83			2
3		2.00			0.52				0.27			0.80			3
4		1.80			0.58				0.26			0.83			4
5		2.20			0.60				0.26			0.80			5
6		2.50			0.53				0.26			0.79			6
7		3.10			0.55				0.24			0.85			7
8		2.90			0.63				0.27			0.82			8
9		3.60			0.68				0.27			0.83			9
10		1.30			0.61				0.26			0.79			10
11		2.00			0.55				0.28			0.83			11
12		1.20			0.78				0.25			0.85			12
13		1.90			0.61				0.26			0.81			13
14		1.50			0.52				0.24			0.77			14
15		2.00			0.55				0.27			0.80			15
16		2.00			0.75				0.27			0.86			16
17		1.60			0.66				0.27			0.80			17
18		1.60			0.62				0.26			0.78			18
19		1.70			0.57				0.24			0.83			19
20		1.30			0.62				0.28			0.82			20
21		1.20			0.68				0.25			0.79			21
22		1.80			0.63				0.27			0.82			22
23		1.70			0.66				0.28			0.83			23
24		1.90			0.63				0.26			0.82			24
25		1.60			0.69				0.26			0.82			25
26		1.70			0.53				0.23			0.78			26
27		1.60			0.63				0.27			0.81			27
28		1.70			0.59				0.23			0.79			28
29		1.80			0.64				0.25			0.84			29
30		2.10			0.64				0.25			0.85			30
31															31

TABLE 3.1: DISINFECTION PROFILE MAY 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.00			0.56				0.27			0.80			1
2		2.10			0.67				0.25			0.85			2
3		1.70			0.66				0.25			0.87			3
4		1.80			0.62				0.25			0.79			4
5		1.70			0.63				0.23			0.81			5
6		2.40			0.59				0.25			0.80			6
7		2.50			0.67				0.15			0.83			7
8		2.00			0.60				0.24			0.79			8
9		1.80			0.63				0.25			0.80			9
10		2.10			0.58				0.22			0.84			10
11		2.20			0.54				0.23			0.86			11
12		2.50			0.64				0.23			0.81			12
13		2.40			0.61				0.24			0.83			13
14		3.50			0.55				0.24			0.82			14
15		3.10			0.48				0.24			0.80			15
16		1.50			0.69				0.23			0.87			16
17		1.70			0.69				0.27			0.83			17
18		1.90			0.65				0.26			0.83			18
19		2.20			0.45				0.27			0.84			19
20		2.30			0.71				0.27			0.91			20
21		1.30			0.59				0.27			0.85			21
22		1.20			0.56				0.26			0.82			22
23		1.90			0.61				0.26			0.82			23
24		1.40			0.63				0.22			0.91			24
25		1.40			0.62				0.23			0.84			25
26		1.60			0.54				0.23			0.79			26
27		2.20			0.61				0.26			0.84			27
28		1.10			0.63				0.24			0.84			28
29		1.10			0.60				0.22			0.84			29
30		1.60			0.54				0.22			0.80			30
31		1.40			0.54				0.19			0.87			31

TABLE 3.1: DISINFECTION PROFILE JUN 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.30			0.63				0.21			0.80			1
2		1.40			0.64				0.24			0.83			2
3		1.40			0.59				0.23			0.78			3
4		1.70			0.52				0.21			0.81			4
5		1.70			0.65				0.24			0.82			5
6		1.50			0.48				0.25			0.80			6
7		1.60			0.71				0.23			0.83			7
8		1.70			0.52				0.23			0.81			8
9		1.60			0.47				0.22			0.83			9
10		1.90			0.59				0.23			0.81			10
11		1.70			0.61				0.24			0.79			11
12		2.20			0.59				0.27			0.78			12
13		4.00			0.50				0.24			0.76			13
14		2.30			0.61				0.21			0.81			14
15		2.00			0.59				0.24			0.82			15
16		2.60			0.51				0.22			0.79			16
17		2.70			0.64				0.22			0.80			17
18		2.60			0.67				0.24			0.85			18
19		2.30			0.65				0.24			0.84			19
20		3.10			0.51				0.23			0.82			20
21		3.50			0.58				0.22			0.87			21
22		2.90			0.67				0.22			0.81			22
23		2.50			0.66				0.21			0.86			23
24		3.10			0.44				0.24			0.96			24
25		2.60			0.61				0.21			0.83			25
26		2.20			0.60				0.23			0.81			26
27		2.50			0.67				0.21			0.80			27
28		2.80			0.51				0.21			0.81			28
29		2.50			0.64				0.21			0.80			29
30		2.30			0.63				0.24			0.80			30
31															31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE JUL 1986

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.50			0.62				0.23			0.82			1
2		0.87			0.57				0.23			0.84			2
3		1.30			0.60				0.22			0.81			3
4		1.50			0.59				0.21			0.83			4
5		1.50			0.54				0.18			0.83			5
6		2.00			0.57				0.18			0.81			6
7		1.20			0.63				0.16			0.83			7
8		1.70			0.63				0.20			0.85			8
9		1.70			0.55				0.23			0.82			9
10		1.70			0.65				0.20			0.87			10
11		1.80			0.71				0.24			0.86			11
12		1.70			0.63				0.23			0.82			12
13		1.40			0.61				0.23			0.79			13
14		1.90			0.58				0.22			0.82			14
15		1.50			0.62				0.21			0.94			15
16		1.20			0.61				0.23			0.82			16
17		1.40			0.54				0.22			0.80			17
18		1.90			0.47				0.22			0.83			18
19		1.40			0.66				0.19			0.74			19
20		1.50			0.61				0.20			0.79			20
21		1.50			0.66				0.20			0.82			21
22		1.80			0.66				0.20			0.83			22
23		2.10			0.65				0.19			0.84			23
24		2.00			0.53				0.20			0.79			24
25		2.20			0.81				0.22			0.85			25
26		1.70			0.81				0.23			0.81			26
27		2.40			0.61				0.23			0.82			27
28		1.80			0.59				0.22			0.82			28
29		1.40			0.55				0.23			0.85			29
30		1.30			0.62				0.21			0.83			30
31		2.60			0.57				0.21			0.83			31

TABLE 3.1: DISINFECTION PROFILE AUG 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.70			0.68				0.21			0.83			1
2		3.20			0.63				0.23			0.78			2
3		2.90			0.65				0.24			0.82			3
4		2.30			0.67				0.21			0.84			4
5		6.60			0.65				0.22			0.85			5
6		1.90			0.61				0.23			0.80			6
7		2.10			0.54				0.25			0.78			7
8		2.10			0.46				0.24			0.84			8
9		2.90			0.52				0.22			0.79			9
10		2.00			0.70				0.24			0.81			10
11		1.90			0.64				0.21			0.80			11
12		2.70			0.60				0.23			0.84			12
13		3.20			0.64				0.24			0.80			13
14		2.40			0.63				0.25			0.85			14
15		2.90			0.59				0.24			0.80			15
16		2.70			0.56				0.23			0.79			16
17		2.70			0.68				0.25			0.81			17
18		2.10			0.63				0.22			0.81			18
19		1.70			0.57				0.23			0.83			19
20		1.70			0.54				0.22			0.82			20
21		1.90			0.59				0.22			0.84			21
22		1.60			0.57				0.22			0.80			22
23		2.00			0.55				0.22			0.80			23
24		2.40			0.60				0.22			0.84			24
25		1.60			0.55				0.23			0.87			25
26		2.00			0.62				0.24			0.82			26
27		1.20			0.54				0.25			0.84			27
28		1.90			0.57				0.26			0.83			28
29		1.90			0.67				0.26			0.84			29
30		1.20			0.66				0.24			0.86			30
31		1.80			0.63				0.25			0.83			31

TABLE 3.1: DISINFECTION PROFILE SEP 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		1.60			0.57				0.22			0.81			1
2		1.60			0.61				0.22			0.82			2
3		1.40			0.57				0.22			0.79			3
4		1.70			0.64				0.29			0.81			4
5		1.80			0.59				0.25			0.78			5
6		2.30			0.94				0.25			0.86			6
7		1.90			1.00				0.26			0.86			7
8		1.70			1.05				0.24			0.86			8
9		1.80			0.79				0.24			0.82			9
10		2.10			0.89				0.25			0.98			10
11		1.20			0.98				0.25			0.79			11
12		2.00			0.69				0.27			1.08			12
13		1.50			0.75				0.25			1.04			13
14		1.80			0.92				0.30			1.01			14
15		2.20			0.89				0.26			0.93			15
16		1.50			0.90				0.25			1.02			16
17		1.90			0.77				0.26			1.00			17
18		2.10			1.25				0.29			1.00			18
19		1.70			0.97				0.29			1.01			19
20		1.90			1.10				0.26			1.05			20
21		2.00			0.80				0.28			1.16			21
22		2.00			0.91				0.26			1.00			22
23		2.10			0.96				0.27			1.03			23
24		2.10			1.00				0.28			1.00			24
25		2.30			0.85				0.28			1.01			25
26		3.00			0.80				0.29			0.97			26
27		2.70			1.30				0.27			0.90			27
28		3.30			0.93				0.26			0.94			28
29		2.60			0.96				0.25			0.96			29
30		2.50			0.66				0.24			1.03			30
31															31

TABLE 3.1: DISINFECTION PROFILE OCT 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	C12		NH3	SO2	RESIDUAL C12			C12		NH3	SO2	RESIDUAL C12			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.80			0.76				0.26			1.16			1
2		3.40			0.98				0.28			0.96			2
3		3.40			0.89				0.28			0.99			3
4		3.50			0.89				0.27			1.03			4
5		3.90			0.87				0.27			0.99			5
6		3.80			0.92				0.27			0.95			6
7		3.80			0.93				0.29			1.02			7
8		2.20			0.96				0.30			0.80			8
9		1.90			0.86				0.31			0.80			9
10		2.20			0.91				0.31			0.82			10
11		2.10			0.90				0.30			0.84			11
12		2.20			0.75				0.32			0.78			12
13		2.40			0.95				0.30			0.82			13
14		1.50			0.81				0.30			0.78			14
15		2.70			1.05				0.32			0.71			15
16		2.60			1.24				0.31			0.86			16
17		2.90			0.87				0.31			0.90			17
18		1.80			0.92				0.30			0.82			18
19		1.80			0.83				0.31			0.78			19
20		1.80			0.91				0.30			0.75			20
21		1.50			0.74				0.31			0.79			21
22		2.20			0.71				0.30			0.85			22
23		2.20			0.76				0.31			0.87			23
24		1.20			0.81				0.31			0.71			24
25		2.10			0.68				0.30			0.69			25
26		2.20			0.92				0.30			0.70			26
27		1.70			0.95				0.28			0.82			27
28		2.30			0.83				0.32			0.80			28
29		2.20			0.85				0.32			0.77			29
30		1.40			0.86				0.32			0.83			30
31		2.60			0.84				0.32			0.79			31

TABLE 3.1: DISINFECTION PROFILE NOV 1986

DATE	PRE-CHLORINATION							POST-CHLORINATION							DATE
	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.70			1.16				0.30			1.03			1
2		2.00			0.95				0.30			1.04			2
3		1.80			0.93				0.31			1.04			3
4		2.20			0.65				0.33			0.93			4
5		3.50			0.98				0.33			1.07			5
6		1.90			0.85				0.32			1.00			6
7		2.20			0.88				0.31			1.05			7
8		2.50			0.80				0.30			0.99			8
9		2.50			0.96				0.31			1.05			9
10		2.80			0.89				0.30			0.96			10
11		2.30			0.95				0.33			1.01			11
12		1.90			0.85				0.32			1.02			12
13		2.20			0.91				0.34			1.16			13
14		2.60			0.85				0.34			1.13			14
15		2.70			0.87				0.35			1.14			15
16		2.50			0.82				0.37			1.00			16
17		2.40			0.84				0.34			1.02			17
18		2.90			0.79				0.35			0.96			18
19		2.80			0.85				0.34			0.98			19
20		3.00			0.79				0.36			0.97			20
21		3.70			0.77				0.35			0.84			21
22		3.60			0.77				0.34			0.89			22
23		3.00			0.87				0.37			0.97			23
24		2.40			0.87				0.33			0.93			24
25		2.40			0.80				0.33			0.88			25
26		3.00			0.74				0.32			0.95			26
27		3.10			1.02				0.32			0.98			27
28		3.10			0.85				0.33			0.92			28
29		2.70			0.96				0.28			0.98			29
30		2.60			0.93				0.31			0.91			30
31															31

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 3.1: DISINFECTION PROFILE DEC 1986

	PRE-CHLORINATION							POST-CHLORINATION							
DATE	Cl2		NH3	SO2	RESIDUAL Cl2			Cl2		NH3	SO2	RESIDUAL Cl2			DATE
	Dem.	Dos.			Free	Comb.	Total	Dem.	Dos.			Free	Comb.	Total	
1		2.80			0.90				0.31			1.07			1
2		1.70			0.80				0.34			1.08			2
3		2.70			0.82				0.35			0.94			3
4		2.70			0.91				0.36			0.95			4
5		2.10			0.87				0.36			1.13			5
6		1.80			0.70				0.35			0.93			6
7		2.50			1.20				0.36			0.93			7
8		1.60			0.92				0.35			1.00			8
9		2.60			0.78				0.37			0.90			9
10		2.60			0.72				0.37			0.90			10
11		2.00			0.92				0.33			0.97			11
12		1.70			0.79				0.28			0.86			12
13		1.70			0.81				0.27			0.95			13
14		2.00			0.73				0.27			0.88			14
15		1.90			0.89				0.27			0.94			15
16		2.10			0.82				0.28			0.90			16
17		2.60			0.86				0.31			0.87			17
18		2.90			0.79				0.35			0.90			18
19		2.20			0.81				0.38			0.98			19
20		2.10			0.81				0.35			0.98			20
21		2.00			0.88				0.35			0.94			21
22		2.50			0.86				0.35			0.94			22
23		1.90			0.78				0.32			1.01			23
24		2.80			0.74				0.35			1.01			24
25		2.50			0.84				0.42			1.03			25
26		2.60			0.85				0.36			0.94			26
27		1.80			0.90				0.37			1.09			27
28		1.30			0.70				0.37			0.90			28
29		2.10			0.86				0.36			0.92			29
30		1.80			0.76				0.37			1.00			30
31		1.30			0.83				0.27			0.93			31

TABLE 4.0: T&O CONTROL ALKALINITY ADJ. & FLUORIDATION SUMMARY

		1986			1985			1984			1983		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
JAN	PAC	5.70	3.80	4.67									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.06	0.98	1.01	1.50	1.03	1.20	1.23	0.47	1.03			
	F Res.												
FEB	PAC	7.00	3.50	5.12									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.03	0.94	1.00	1.34	1.15	1.21	1.26	0.96	1.05			
	F Res.												
MAR	PAC	7.00	5.30	6.25									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.08	0.83	0.96	1.25	0.58	1.16	1.10	0.86	1.03			
	F Res.												
APR	PAC	6.70	5.40	6.19									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.18	0.93	1.06	1.27	0.84	1.14	1.20	0.86	1.03			
	F Res.												

TABLE 4.0: T&O CONTROL ALKALINITY ADJ. &
FLUORIDATION SUMMARY

		1986			1985			1984			1983		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
MAY	PAC	6.50	4.50	5.81									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.40	0.89	1.12	1.17	1.04	1.10	1.34	1.01	1.12			
	F Res.												
JUN	PAC	6.30	5.00	5.48									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.18	0.82	1.10	1.11	0.48	1.03	1.25	0.83	1.05			
	F Res.												
JUL	PAC	6.20	3.80	5.20									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.22	0.98	1.12	1.17	0.53	1.07	1.12	0.78	0.97			
	F Res.												
AUG	PAC	6.20	4.90	5.68									
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.21	1.04	1.15	1.44	1.03	1.11	1.06	0.87	1.01			
	F Res.												

TABLE 4.0: T&O CONTROL ALKALINITY ADJ. &
FLUORIDATION SUMMARY

		1986			1985			1984			1983		
		MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.	MAX.	MIN.	AVG.
SEP	PAC	7.00	5.20	6.24	5.80	4.10	4.67						
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.	1.23	0.08	0.77	1.29	1.03	1.10	1.40	0.62	1.02			
	F Res.												
OCT	PAC	7.60	6.20	7.07	5.50	4.20	4.86						
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.				1.10	0.96	1.05	1.20	0.90	1.06			
	F Res.												
NOV	PAC	8.70	4.20	7.12	5.70	4.40	5.08						
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.				1.06	0.85	0.98	1.33	1.10	1.18			
	F Res.												
DEC	PAC	6.00	4.00	4.92	6.30	4.20	5.05						
	KMNo4												
	Lime												
	Soda Ash												
	F Dos.				1.58	0.94	1.05	1.25	1.04	1.19			
	F Res.												

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JAN 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.10	1.10
2						0.47	1.00
3						1.10	0.99
4						1.05	1.14
5						0.87	1.06
6						1.08	1.08
7						1.05	1.08
8						1.05	1.10
9						1.04	1.09
10						1.23	1.11
11						0.99	1.08
12						1.15	1.07
13						1.01	1.07
14						1.02	1.06
15						1.03	1.07
16						0.99	1.10
17						1.04	1.05
18						1.01	1.01
19						1.07	1.07
20						1.06	1.12
21						1.07	1.07
22						1.05	1.02
23						1.08	1.11
24						0.98	1.10
25						1.05	1.12
26						1.07	1.00
27						1.05	1.10
28						0.99	1.15
29						1.11	1.03
30						1.05	1.05
31						0.93	1.10

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

FEB 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.10	1.10
2						1.02	1.12
3						1.10	1.10
4						1.03	1.14
5						1.10	1.06
6						1.18	1.05
7						1.10	1.00
8						1.06	1.08
9						1.04	1.07
10						0.98	1.15
11						1.03	1.05
12						1.03	1.14
13						1.05	1.09
14						1.00	1.08
15						1.04	1.14
16						0.97	1.10
17						1.03	1.15
18						1.26	1.13
19						1.03	1.06
20						0.96	1.10
21						1.02	1.07
22						1.02	1.02
23						1.03	1.13
24						1.07	1.07
25						1.05	1.05
26						1.01	1.01
27						1.07	1.07
28						1.07	1.07
29						1.06	1.16
30							
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAR 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						0.96	1.01
2						1.06	1.06
3						1.04	1.06
4						1.04	1.12
5						1.07	1.05
6						1.05	1.06
7						1.03	1.11
8						1.10	1.14
9						1.04	1.15
10						1.07	1.11
11						1.08	1.10
12						1.03	1.04
13						1.00	1.12
14						0.98	0.98
15						0.96	0.97
16						1.03	1.05
17						1.07	0.96
18						1.05	1.10
19						1.04	1.05
20						1.04	1.09
21						1.00	1.18
22						0.86	1.14
23						1.04	1.11
24						1.00	1.13
25						1.06	1.19
26						1.06	1.12
27						1.03	1.06
28						1.03	1.12
29						1.04	1.15
30						1.04	1.04
31						1.05	1.02

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

APR 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.02	1.03
2						1.04	1.14
3						1.05	1.10
4						1.05	1.13
5						0.99	1.14
6						1.05	1.09
7						1.03	1.09
8						1.04	0.98
9						1.03	1.05
10						0.91	1.07
11						1.10	1.08
12						1.10	1.04
13						1.20	0.98
14						1.02	1.03
15						0.97	1.12
16						1.03	1.13
17						1.05	1.12
18						0.98	1.08
19						1.02	1.09
20						0.96	1.03
21						1.04	1.09
22						0.98	1.03
23						1.04	1.14
24						1.03	1.10
25						1.05	1.05
26						1.04	1.11
27						1.10	1.01
28						0.80	1.02
29						1.03	1.00
30						1.00	0.96
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAY 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.04	1.03
2						1.09	1.09
3						1.05	1.12
4						1.01	1.00
5						1.02	0.94
6						1.01	0.95
7						1.02	1.20
8						1.05	1.12
9						1.26	1.09
10						1.12	1.04
11						1.08	1.12
12						1.12	1.09
13						1.17	1.02
14						1.15	1.11
15						1.16	1.10
16						1.12	1.04
17						1.15	1.12
18						1.10	1.11
19						1.10	1.13
20						1.30	1.13
21						1.16	1.12
22						1.11	1.14
23						1.34	1.05
24						1.18	0.98
25						1.14	1.12
26						1.17	1.09
27						1.13	1.15
28						1.13	1.18
29						1.05	1.13
30						1.05	1.19
31						1.10	1.15

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JUN 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.03	1.16
2						1.12	1.11
3						1.03	1.13
4						1.13	1.05
5						1.15	1.08
6						1.11	1.12
7						1.12	1.09
8						1.10	1.14
9						1.03	1.04
10						1.10	1.19
11						1.06	1.16
12						1.07	1.14
13						1.00	1.14
14						1.15	0.98
15						1.06	0.97
16						1.02	1.09
17						1.04	1.13
18						0.88	1.15
19						1.25	1.15
20						1.03	1.07
21						1.10	1.05
22						0.83	0.98
23						1.02	0.94
24						1.20	0.92
25						0.89	1.10
26						0.94	1.03
27						1.04	1.13
28						1.03	1.01
29						1.01	0.99
30						1.03	1.06
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JUL 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1						0.97	1.02
2						0.96	1.04
3						0.98	1.03
4						0.92	1.08
5						0.96	1.05
6						0.96	0.97
7						1.03	0.99
8						1.04	1.05
9						0.99	1.02
10						0.93	1.03
11						0.98	1.05
12						0.94	1.09
13						0.96	1.13
14						0.97	1.07
15						0.98	1.08
16						0.97	1.01
17						0.98	1.00
18						1.04	1.10
19						1.03	0.97
20						0.92	1.04
21						0.97	1.06
22						0.99	1.05
23						0.95	0.92
24						0.90	1.01
25						0.98	0.98
26						0.96	0.90
27						1.12	0.93
28						0.79	1.04
29						0.78	1.01
30						1.03	0.96
31						1.00	0.96

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

AUG 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						0.87	1.15
2						1.05	1.17
3						1.02	1.06
4						0.89	1.06
5						0.98	1.07
6						1.04	1.12
7						0.98	1.00
8						1.04	1.03
9						0.96	1.04
10						1.03	1.10
11						0.99	1.36
12						0.99	1.09
13						1.00	1.11
14						1.00	0.96
15						1.00	0.95
16						1.06	0.97
17						0.98	1.01
18						1.04	1.04
19						1.05	1.01
20						0.99	1.00
21						0.99	1.00
22						1.04	1.09
23						1.05	1.08
24						1.03	1.00
25						1.05	1.06
26						0.95	1.10
27						1.06	1.13
28						1.05	1.12
29						1.03	0.98
30						0.97	1.04
31						1.04	1.06

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

SEP 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1						1.20	1.06
2						1.05	1.03
3						1.40	1.02
4						0.62	1.12
5						0.75	1.12
6						1.06	1.22
7						0.85	1.03
8						1.00	1.08
9						1.05	1.09
10						0.95	0.99
11						1.04	1.15
12						0.99	1.25
13						1.02	1.05
14						1.02	1.04
15						0.87	1.08
16						1.05	1.11
17						1.01	1.06
18						1.03	1.01
19						1.02	1.00
20						1.01	1.08
21						1.02	1.10
22						1.02	1.14
23						1.03	1.15
24						1.02	1.12
25						1.01	1.07
26						1.04	1.11
27						1.04	0.98
28						0.99	1.14
29						1.17	1.14
30						1.14	1.11
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

OCT 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.10	1.09
2						1.10	1.10
3						1.02	1.10
4						1.10	1.10
5						1.10	1.12
6						1.20	1.10
7						0.99	1.10
8						1.10	1.04
9						1.10	0.94
10						0.97	1.04
11						1.04	1.02
12						1.05	0.92
13						1.05	0.92
14						1.09	1.02
15						1.07	0.95
16						1.08	0.98
17						1.06	0.95
18						0.97	0.97
19						1.08	0.95
20						1.06	1.03
21						1.07	1.04
22						1.08	0.99
23						0.90	0.95
24						1.08	0.99
25						1.08	0.98
26						1.05	1.06
27						1.04	1.07
28						1.04	0.98
29						1.05	1.03
30						1.06	1.07
31						1.16	0.93

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

NOV 1984

DATE	PAC mg/L	$KMnO_4$	LIME	SODA ASH	$NaHCO_3$	FLUORIDE	
						Dosage	Residual
1						1.19	0.90
2						1.16	0.98
3						1.15	0.92
4						1.11	0.95
5						1.33	0.92
6						1.18	0.95
7						1.10	0.92
8						1.30	0.97
9						1.20	1.10
10						1.30	1.13
11						1.20	1.10
12						1.10	1.03
13						1.10	1.02
14						1.19	1.10
15						1.17	1.06
16						1.17	1.09
17						1.20	1.20
18						1.10	1.10
19						1.20	1.10
20						1.19	1.06
21						1.20	1.07
22						1.20	1.11
23						1.14	1.01
24						1.16	1.05
25						1.19	1.08
26						1.21	1.00
27						1.17	1.03
28						1.19	1.08
29						1.17	1.15
30						1.19	1.10
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

DEC 1984

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1						1.04	1.09
2						1.18	1.10
3						1.17	0.94
4						1.16	1.05
5						1.20	1.06
6						1.20	1.13
7						1.20	0.97
8						1.14	1.04
9						1.13	1.07
10						1.21	1.00
11						1.20	1.12
12						1.20	1.00
13						1.20	1.12
14						1.25	1.20
15						1.20	1.10
16						1.25	1.03
17						1.20	1.10
18						1.20	1.20
19						1.17	1.19
20						1.19	1.14
21						1.20	1.10
22						1.19	1.06
23						1.20	1.05
24						1.21	1.07
25						1.22	1.05
26						1.21	1.07
27						1.15	1.08
28						1.20	1.06
29						1.19	1.09
30						1.14	1.10
31						1.15	1.07

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JAN 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.17	1.04
2						1.19	1.04
3						1.17	1.08
4						1.16	1.03
5						1.12	1.11
6						1.18	1.04
7						1.19	1.19
8						1.16	1.01
9						1.03	1.02
10						1.21	1.00
11						1.17	1.00
12						1.17	0.97
13						1.20	0.98
14						1.20	1.12
15						1.20	1.12
16						1.40	1.03
17						1.20	1.00
18						1.20	1.02
19						1.30	1.05
20						1.20	1.07
21						1.10	1.03
22						1.50	1.10
23						1.21	1.08
24						1.32	1.20
25						1.20	1.09
26						1.20	1.03
27						1.18	1.04
28						1.20	1.11
29						1.18	1.09
30						1.17	1.05
31						1.16	1.07

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

FEB 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.18	1.06
2						1.24	1.08
3						1.24	1.07
4						1.20	1.27
5						1.23	1.06
6						1.18	1.05
7						1.17	1.00
8						1.15	0.97
9						1.20	1.04
10						1.20	1.11
11						1.19	1.10
12						1.22	1.10
13						1.22	1.03
14						1.34	1.03
15						1.17	1.02
16						1.30	1.07
17						1.15	1.11
18						1.23	1.04
19						1.20	1.12
20						1.21	1.05
21						1.24	1.10
22						1.20	1.09
23						1.20	1.21
24						1.30	1.00
25						1.20	1.01
26						1.20	1.07
27						1.24	1.06
28						1.20	
29							
30							
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAR 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.19	1.08
2						1.25	1.02
3						1.22	1.12
4						1.16	1.00
5						1.23	1.06
6						1.16	1.08
7						1.18	1.13
8						1.19	1.03
9						1.22	1.07
10						0.93	0.98
11						1.18	1.10
12						1.10	0.98
13						1.12	0.98
14						1.14	1.03
15						1.22	1.04
16						1.21	1.05
17						1.18	1.03
18						1.16	1.03
19						1.21	1.01
20						1.15	1.03
21						1.18	0.95
22						1.25	1.03
23						1.24	1.10
24						1.24	1.10
25						1.00	1.10
26						1.21	1.12
27						1.21	1.05
28						1.20	1.11
29						1.20	1.14
30						1.20	1.13
31						0.58	1.00

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

APR 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.20	1.06
2						1.20	1.20
3						1.24	1.17
4						1.20	1.12
5						1.18	1.09
6						1.25	1.00
7						1.21	1.09
8						1.23	1.03
9						1.26	1.17
10						1.19	1.09
11						1.20	1.05
12						1.25	1.13
13						1.27	1.12
14						1.05	1.20
15						1.19	1.03
16						1.12	1.08
17						1.06	1.10
18						1.09	1.10
19						1.10	1.02
20						1.12	1.14
21						1.13	1.11
22						1.11	1.07
23						1.12	1.11
24						0.84	1.12
25						1.10	1.02
26						1.10	1.15
27						0.94	1.08
28						1.07	1.01
29						1.06	1.06
30						1.14	1.09
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAY 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.12	1.11
2						1.10	1.05
3						1.10	1.01
4						1.10	1.09
5						1.12	1.08
6						1.13	1.19
7						1.06	1.07
8						1.10	1.08
9						1.10	1.12
10						1.10	1.21
11						1.05	1.11
12						1.17	1.17
13						1.13	1.13
14						1.12	1.14
15						1.08	1.05
16						1.11	1.05
17						1.10	1.00
18						1.13	0.99
19						1.10	1.07
20						1.13	1.09
21						1.11	1.11
22						1.09	1.04
23						1.10	1.08
24						1.08	1.02
25						1.04	1.00
26						1.06	1.04
27						1.10	1.09
28						1.12	1.06
29						1.10	1.02
30						1.07	1.08
31						1.08	1.12

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JUN 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.08	1.10
2						1.07	1.09
3						1.08	1.05
4						1.10	1.11
5						1.10	11.40
6						1.10	1.06
7						1.09	1.14
8						1.10	1.15
9						1.10	1.15
10						1.11	1.10
11						1.09	1.07
12						1.05	1.00
13						1.05	1.12
14						1.09	0.98
15						1.10	1.03
16						1.10	1.09
17						1.11	1.07
18						0.48	1.10
19						0.00	0.00
20						0.00	0.00
21						0.00	0.00
22						0.00	0.00
23						0.00	0.00
24						0.70	0.96
25						1.01	1.06
26						1.02	1.13
27						1.01	1.08
28						1.02	1.06
29						1.04	1.01
30						1.03	1.05
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE JUL 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.09	1.04
2						1.10	0.91
3						1.08	0.98
4						1.06	1.09
5						1.09	1.06
6						1.02	1.07
7						1.00	1.05
8						0.53	1.05
9						1.08	1.06
10						1.10	1.16
11						1.08	1.15
12						1.10	1.07
13						1.07	1.10
14						1.13	1.05
15						1.09	1.00
16						1.12	1.10
17						1.17	1.05
18						1.15	1.08
19						1.10	1.02
20						1.08	1.01
21						1.11	1.09
22						1.14	1.08
23						0.98	1.06
24						1.06	1.18
25						1.07	1.17
26						1.10	1.12
27						1.08	1.10
28						1.08	1.10
29						0.97	1.09
30						1.12	1.09
31						1.10	1.07

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

AUG 1985

DATE	PAC	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.12	1.03
2						1.10	1.09
3						1.11	1.02
4						1.10	1.05
5						1.14	1.05
6						1.15	1.14
7						1.10	1.06
8						1.10	1.09
9						1.13	1.11
10						1.09	1.04
11						1.11	1.03
12						1.44	1.06
13						1.11	1.13
14						1.12	1.15
15						1.11	1.08
16						1.09	0.99
17						1.10	1.10
18						1.10	1.14
19						1.11	1.03
20						1.11	0.98
21						1.08	1.02
22						1.03	1.02
23						1.03	0.99
24						1.16	0.99
25						1.09	1.12
26						1.08	1.15
27						1.08	1.04
28						1.05	1.06
29						1.04	1.12
30						1.09	1.04
31						1.12	1.06

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

SEP 1985

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1						1.13	1.02
2						1.08	1.09
3	4.10					1.09	1.17
4	4.40					1.08	1.14
5	4.50					1.10	1.08
6	4.80					1.09	1.14
7	4.20					1.11	1.07
8	4.50					1.12	1.04
9	4.80					1.08	1.05
10	5.00						1.10
11	4.90					1.11	1.09
12	5.00					1.09	1.08
13	5.10					1.09	1.09
14	4.70					1.03	1.08
15	5.10					1.06	1.04
16	4.80					1.08	1.08
17	4.90					1.11	1.08
18	4.70					1.09	1.12
19	4.80					1.05	1.09
20	4.70					1.10	1.14
21	4.70					1.07	1.06
22	4.70					1.10	1.14
23	4.70					1.11	1.15
24	5.10					1.29	1.02
25	5.80					1.06	1.13
26	5.30					1.06	1.18
27	5.30					1.10	1.11
28	4.90					1.10	1.06
29	4.80					1.09	1.06
30	5.10					1.15	1.14
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

OCT 1985

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	4.40					1.06	1.12
2	5.10					1.08	1.04
3	4.50					1.10	1.01
4	5.00					1.09	1.06
5	4.70					1.10	1.10
6	5.00					1.05	1.12
7	4.20					1.08	0.99
8	5.20					1.10	1.10
9	4.60					1.09	1.10
10	5.30					1.10	1.06
11	5.10					1.08	1.01
12	5.20					1.07	1.03
13	4.70					1.05	1.03
14	5.20					1.09	1.10
15	4.50					1.08	1.03
16	5.20					1.04	1.17
17	4.50					1.07	1.03
18	5.40					1.01	1.11
19	4.60					1.09	1.04
20	5.30					1.05	1.09
21	4.50					1.07	1.13
22	5.20					1.01	1.07
23	4.50					1.03	1.04
24	5.20					1.02	1.12
25	4.30					1.06	1.08
26	5.10					1.05	1.08
27	4.50					0.97	1.05
28	5.20					0.96	1.10
29	4.40					1.02	1.12
30	5.50					1.00	1.09
31	4.50					0.97	1.06

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

NOV 1985

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	5.30					1.01	1.13
2	5.20					0.97	1.06
3	5.50					0.97	1.03
4	5.30					1.02	1.10
5	5.40					0.99	1.08
6	5.10					0.86	1.10
7	5.40					1.02	1.04
8	4.80					1.03	1.11
9	5.50					1.01	1.10
10	4.50					0.96	1.10
11	5.50					1.03	1.15
12	4.60					0.93	1.10
13	4.60					0.95	1.16
14	5.30					1.01	1.11
15	4.40					1.06	1.13
16	5.50					1.03	1.07
17	4.70					1.05	1.07
18	5.70					1.03	1.01
19	4.60					0.97	1.10
20	5.60					0.97	1.12
21	4.60					1.04	1.10
22	5.50					0.90	1.09
23	4.60					0.94	1.12
24	5.40					0.85	1.06
25	4.40					0.85	1.04
26	5.50					1.02	1.06
27	4.50					1.03	1.08
28	5.30					1.03	1.11
29	4.70					1.00	1.14
30	5.30					0.99	1.09
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

DEC 1985

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	4.50					0.94	1.14
2	5.20					0.95	1.01
3	4.70					0.99	1.07
4	5.60					1.04	1.03
5	4.20					1.05	1.05
6	5.50					1.08	1.14
7	4.20					1.05	1.16
8	5.50					1.06	1.15
9	4.30					1.07	1.08
10	6.30					1.21	1.13
11	4.60					1.58	1.19
12	5.40					1.02	1.09
13	4.60					1.04	1.14
14	5.20					1.02	1.15
15	5.50					1.04	1.12
16	4.50					0.95	1.08
17	4.70					1.07	1.13
18	5.20					1.02	1.14
19	5.30					1.06	1.20
20	5.20					1.05	1.13
21	5.00					1.07	1.07
22	5.20					1.02	1.10
23	5.50					1.04	1.08
24	5.20					0.94	1.06
25	5.30					1.02	1.11
26	5.30					0.99	1.09
27	4.70					1.24	1.12
28	5.30					1.02	1.09
29	4.90					1.03	1.10
30	5.30					1.00	1.03
31	4.60					1.00	1.06

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JAN 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	5.50					1.02	1.06
2	4.70					0.98	1.07
3	5.50					1.02	1.09
4	4.50					1.02	1.09
5	5.70					1.05	1.08
6	4.40					1.02	1.11
7	5.50					1.01	1.09
8	4.80					1.04	1.09
9	5.00					1.03	1.12
10	4.60					1.02	1.05
11	4.90					1.00	1.14
12	4.40					1.00	1.14
13	4.90					1.02	1.03
14	4.60					1.02	1.11
15	5.20					1.00	1.09
16	4.60					1.00	1.12
17	4.60					1.00	1.04
18	3.80					1.00	1.09
19	5.10					1.00	1.06
20	4.30					0.99	1.09
21	5.00					1.00	1.05
22	4.90					1.02	1.08
23	4.40					1.02	1.08
24	4.60					1.00	1.07
25	4.00					1.00	1.13
26	4.10					1.01	1.10
27	4.00					1.01	1.09
28	4.10					1.04	1.09
29	4.30					1.06	1.13
30	4.50					1.02	1.15
31	4.30					1.01	1.07

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

FEB 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	4.60					1.03	1.05
2	4.20					1.02	1.13
3	4.60					1.00	0.97
4	4.30					1.03	1.04
5	4.70					1.03	1.09
6	4.20					1.03	1.06
7	4.90					1.01	1.06
8	4.10					0.99	1.05
9	4.90					1.03	1.09
10	4.10					1.02	1.11
11	4.80					1.01	1.10
12	3.80					0.95	1.05
13	3.80					1.00	1.04
14	4.30					1.03	1.05
15	3.50					1.01	1.12
16	4.50					1.02	1.08
17	3.80					1.02	1.04
18	6.50					1.00	1.11
19	5.50					0.95	1.13
20	6.80					0.98	1.11
21	6.20					0.94	1.03
22	6.80					0.98	1.06
23	6.30					0.94	1.04
24	7.00					0.99	1.02
25	6.00					0.96	1.00
26	6.40					1.00	1.15
27	5.90					1.03	1.13
28	6.80					0.98	1.19
29							
30							
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAR 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	5.80					1.02	1.13
2	6.30					1.04	1.08
3	6.00					1.08	1.10
4	7.00					0.99	1.13
5	5.90					0.97	1.13
6	6.70					0.97	1.03
7	6.80					1.00	1.08
8	6.40					0.98	1.09
9	6.70					0.92	1.07
10	6.30					0.94	1.17
11	6.70					0.88	1.03
12	6.90					0.90	1.07
13	6.80					0.87	0.94
14	6.60					0.97	1.01
15	6.10					1.00	1.03
16	5.30					0.99	1.20
17	5.40					1.00	1.10
18	6.80					0.99	1.11
19	6.30					0.95	1.11
20	6.50					0.95	1.05
21	6.20					0.97	1.03
22	6.10					0.99	1.12
23	6.10					0.99	1.09
24	5.90					0.95	1.05
25	6.50					0.83	1.06
26	6.10					0.96	0.96
27	6.00					0.99	1.08
28	5.90					0.93	1.08
29	5.90					0.95	1.04
30	5.90					0.92	1.08
31	6.00					0.96	1.04

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

APR 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	6.20					0.95	1.10
2	6.10					0.98	1.06
3	6.50					0.95	1.03
4	6.40					0.96	1.07
5	6.40					0.94	1.01
6	6.40					0.96	1.00
7	6.00					1.07	1.06
8	6.50					0.98	1.01
9	6.50					1.01	1.10
10	6.40					1.08	1.08
11	6.70					1.05	1.15
12	5.90					0.93	1.11
13	6.20					1.02	1.08
14	5.90					1.07	1.06
15	6.60					1.07	1.15
16	6.40					1.08	0.98
17	6.20					1.07	1.07
18	6.20					1.11	1.12
19	5.70					1.08	1.13
20	6.60					1.10	1.11
21	6.00					1.16	1.08
22	5.90					1.18	1.08
23	6.50					1.14	1.03
24	6.20					1.12	1.05
25	6.10					1.09	1.02
26	5.50					1.08	1.04
27	6.30					1.15	1.03
28	5.40					1.14	1.01
29	5.90					1.08	1.09
30	6.00					1.10	1.06
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

MAY 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	6.50					1.14	1.17
2	6.10					1.10	1.07
3	6.00					1.15	1.07
4	6.10					1.13	1.05
5	5.60					1.12	1.15
6	6.00					1.12	1.06
7	6.00					1.10	1.10
8	5.90					1.08	1.06
9	6.00					1.10	1.09
10	5.70					1.08	1.11
11	5.80					1.07	1.10
12	5.60					1.11	1.06
13	5.70					1.08	1.10
14	5.80					1.11	1.11
15	5.70					1.40	1.08
16	5.70					0.89	1.11
17	5.50					1.13	1.15
18	6.30					1.14	1.10
19	6.10					1.13	1.07
20	6.50					1.11	1.02
21	6.50					1.13	1.00
22	6.10					1.17	1.02
23	6.20					1.14	1.12
24	5.40					1.13	1.20
25	5.40					1.14	1.14
26	5.40					1.12	1.15
27	6.10					1.11	1.11
28	5.40					1.15	1.20
29	5.20					1.14	1.08
30	5.20					1.14	1.03
31	4.50					1.11	1.08

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JUN 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	5.10					1.15	1.11
2	5.60					1.14	1.08
3	5.50					1.07	1.00
4	5.00					1.10	1.06
5	5.80					1.11	1.17
6	6.00					1.10	1.10
7	5.50					1.09	1.00
8	5.60					1.14	1.00
9	5.30					1.10	1.00
10	5.60					1.11	1.08
11	5.70					1.12	1.02
12	6.30					1.14	1.05
13	5.70					1.09	0.98
14	5.20					1.11	1.07
15	5.60					1.07	1.01
16	5.40					1.10	1.01
17	5.50					1.10	1.12
18	5.70					1.04	1.00
19	5.60					1.06	1.06
20	5.60					1.08	1.07
21	5.40					1.12	1.10
22	5.30					1.03	1.16
23	5.00					0.82	1.08
24	5.80					1.13	0.99
25	5.10					1.18	1.08
26	5.50					1.02	1.14
27	5.00					1.15	1.14
28	5.00					1.10	1.16
29	5.10					1.15	1.13
30	5.80					1.16	1.14
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

JUL 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	5.60					1.02	1.12
2	5.60					1.14	1.13
3	5.20					1.15	1.07
4	5.00					1.08	1.12
5	4.40					0.98	1.09
6	4.40					1.06	1.17
7	3.80					1.04	1.10
8	5.00					1.18	1.13
9	5.70					1.09	1.00
10	5.00					1.14	1.06
11	6.20					1.13	1.01
12	5.00					1.17	1.00
13	5.60					1.15	1.09
14	5.50					1.16	1.06
15	5.80					1.12	1.03
16	6.00					1.14	1.14
17	5.70					1.15	1.04
18	4.50					1.06	1.04
19	5.10					1.14	1.03
20	5.00					1.14	1.04
21	5.00					1.15	1.08
22	5.00					1.13	0.94
23	4.70					1.19	1.15
24	4.90					1.11	1.10
25	5.40					1.16	1.12
26	5.50					1.15	1.13
27	5.50					1.22	1.01
28	5.30					1.03	1.09
29	5.60					0.98	1.10
30	5.00					1.18	1.03
31	5.20					1.18	1.06

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

AUG 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	4.90					1.15	1.05
2	5.40					1.05	1.00
3	5.80					1.14	1.05
4	5.10					1.07	1.10
5	5.40					1.12	1.03
6	5.50					1.13	1.06
7	6.10					1.12	1.07
8	5.80					1.16	1.08
9	5.30					1.07	1.00
10	5.80					1.17	1.04
11	5.40					1.04	1.07
12	5.90					1.11	1.02
13	5.90					1.20	1.14
14	5.90					1.17	1.13
15	5.70					1.18	1.19
16	5.80					1.18	1.08
17	6.00					1.20	1.11
18	5.30					1.19	1.15
19	5.60					1.16	1.28
20	5.80					1.19	1.18
21	5.80					1.18	1.15
22	5.30					1.16	1.14
23	5.40					1.16	1.11
24	5.50					1.17	1.14
25	5.80					1.12	1.13
26	5.70					1.19	1.15
27	6.00					1.19	1.10
28	6.20					1.21	1.14
29	6.20					1.19	1.17
30	5.80					1.12	1.18
31	5.90					1.19	1.17

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

SEP 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	5.20					1.17	1.20
2	5.30					1.16	1.08
3	5.30					0.63	1.09
4	6.70					1.19	1.01
5	6.00					1.23	0.55
6	5.80					0.27	
7	6.30					0.80	
8	5.70					0.37	
9	5.80					0.08	
10	6.00						
11	5.90						
12	6.50						
13	5.90						
14	7.00						
15	6.20						
16	6.00						
17	6.20						
18	6.90						
19	6.70						
20	6.20						
21	6.60						
22	6.70						
23	6.80						
24	6.80						
25	6.60						
26	6.90						
27	6.40						
28	6.80						
29	6.30						
30	5.80						
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

OCT 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	6.20						
2	6.80						
3	6.80						
4	6.40						
5	6.50						
6	6.40						
7	6.90						
8	7.30						
9	7.40						
10	7.30						
11	7.00						
12	7.40						
13	6.90						
14	7.10						
15	7.60						
16	7.40						
17	7.30						
18	7.00						
19	7.20						
20	7.00						
21	7.20						
22	7.10						
23	7.30						
24	7.40						
25	7.00						
26	7.20						
27	6.60						
28	7.50						
29	7.40						
30	7.30						
31	7.40						

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

NOV 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE Dosage	FLUORIDE Residual
1	7.00						
2	6.90						
3	7.30						
4	7.50						
5	7.90						
6	7.70						
7	7.40						
8	7.10						
9	7.30						
10	7.30						
11	7.80						
12	7.50						
13	8.70						
14	7.10						
15	7.60						
16	8.20						
17	7.90						
18	8.30						
19	8.00						
20	8.50						
21	8.20						
22	8.00						
23	8.60						
24	7.70						
25	4.80						
26	4.60						
27	5.10						
28	4.80						
29	4.20						
30	4.50						
31							

TABLE 4.1: T&O CONTROL, ALKALINITY ADJ. & FLUORIDATION PROFILE

DEC 1986

DATE	PAC mg/L	KMnO4	LIME	SODA ASH	NaHCO3	FLUORIDE	
						Dosage	Residual
1	4.50						
2	5.00						
3	5.10						
4	5.20						
5	5.20						
6	5.10						
7	5.20						
8	5.10						
9	5.20						
10	5.30						
11	4.80						
12	4.10						
13	4.10						
14	4.10						
15	4.00						
16	4.20						
17	4.60						
18	5.00						
19	5.40						
20	5.10						
21	4.90						
22	5.10						
23	4.70						
24	5.00						
25	6.00						
26	5.30						
27	5.30						
28	5.20						
29	5.30						
30	5.30						
31	4.00						

TABLE 5.0

PLANT Amherstburg Water System **MPOS**
WATER QUALITY - 4-YEAR SUMMARY (1984-1986)

GENERAL CHEMISTRY		19 86			19 85			19 84			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
GENERAL CHEMISTRY															
ALKALINITY	R				82.8	82.8	82.8	89	89	89				0.2	
mg/L	T							74.6	74.6	74.6				mg/L	
AMMONIUM TOTAL	R	.06	.023	.036	.083	.019	.046	.131	.024	.061				0.05	
mg/L	T													mg/L	
CALCIUM	R													0.1	
mg/L	T													mg/L	
CHLORIDE	R	7.9	7.5	7.7	18.3	10.3	13.74	22.1	10.5	14.09				0.2	250
mg/L	T							21.0	21.0	21.0				mg/L	mg/L
COLOUR TCU	R	19.0	1.0	6.1	39			28	1.0	8.1				0.5	5
	T	1.0		<1.0	2		<1.13	7	<1.0	1.8				TCU	TCU
CONDUCTIVITY	R	296	235	258.2	306	236	260	303	231	255				0.01	
umho/cm	T													UMHO/CM	
FIELD CHLORINE (COMBINED)	R													0.1	
	T													mg/L	
FIELD CHLORINE (FREE)	R													0.1	
	T													mg/L	
FIELD CHLORINE (TOTAL)	R													0.1	
	T													mg/L	
FIELD PH	R													0.2	
	T														

TABLE 5.0

AMHERSTBURG
PLANT WATER SYSTEM
MPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

GENERAL CHEMISTRY (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
FIELD TEMPERATURE	R														
	T														
FIELD TURBIDITY	R														1 FTU
	T														
FLUORIDE	R	<1.0	<1.0	<1.0	.18	.12	.18	.11	<.10	<.10				0.01	2.4
mg/L	T	1.09	1.01	.79	1.10	1.05	1.08	1.09	1.01	1.07				mg/L	mg/L
HARDNESS	R				102	102	102	117	117	117				0.5	
mg/L	T							118	118	118				mg/L	
MAGNESIUM	R													0.05	
mg/L	T													mg/L	c
NITRATE	R	1.01	.277	.544	1.39	.265	.77	1.22	.259	.528				0.05	10 mg/L
mg/L	T													mg/L	as N
NITRITE	R	.016	.008	.010	.056	.018	.005	.036	.007	.014				0.005	1 mg/L
mg/L	T													mg/L	as N
NITROGEN TOTAL KJELDAHL	R	.372	.248	.291	.73	.224	.394	.56	.278	.374				0.1	0.15
mg/L	T													mg/L	mg/L *
PH	R														
	T														
PHOSPHORUS FILTERED REACTIVE	R													0.01	
mg/L	T													mg/L	

TABLE 5.0

MPOS

PLANT AMHERSTBURG WATER SYSTEM **WATER QUALITY - 4-YEAR SUMMARY** (1984 - 1986)

GENERAL CHEMISTRY (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
PHOSPHORUS TOTAL	R	.132	.023	.039	.174	.02	.064	.08	.031	.048				0.01	
mg/L	T													mg/L	
SODIUM	R													0.1	
mg/L	T													mg/L	
TOTAL SOLIDS	R													1	
mg/L	T													mg/L	
TURBIDITY	R													0.01	1
FTU	T													FTU	FTU
METALS															
ALUMINUM	R	2.3	.54	1.06	14.0	.062	2.81	1.2	.16	.752	1.2	0.15	.66	0.003	
mg/L	T	.066	.023	.044	15.0	.0004	1.78	.13	.025	.075	.14	.018	.064	mg/L	
ARSENIC	R	.001	.001	.001	.001	.001	.001	.03	.001	.007	.001	.001	.001	0.001	0.05
mg/L	T	.001	.001	.001	.001	.001	.001	.03	.001	.007	.001	.001	.001	mg/L	mg/L
BARIUM	R	.018	.016	.017										0.001	1
mg/L	T	.016	.012	.014										mg/L	mg/L
BERYLLIUM	R	.001	.001	.001										0.001	
mg/L	T	.001	.001	.001										mg/L	
BORON	R	.08	.02	.05										0.02	5
mg/L	T	.08	.02	.053										mg/L	mg/L
CADMIUM	R	.0003	.0002	.0003	.0003	.0002	.0003	.005	.0002	.0012	.002	.0002	.0006	0.0003	0.005
mg/L	T	.0003	.0002	.0003	.0003	.0002	.0003	.001	.0002	.0004	.0005	.0002	.0002	mg/L	mg/L

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

WPOS

WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

METALS (Cont'd)		19 86			19 85			19 84			19 83			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
SELENIUM	R	.001	.001	.001	.001	.001	.001	.03	.001	.007	.001	.001	.001	0.001	0.01
mg/L	T	.001	.001	.001	.001	.001	.001	.03	.001	.007	.001	.001	.001	mg/L	mg/L
STRONTIUM	R	0.15	0.11	0.125										0.001	
mg/L	T	0.13	0.10	0.113										mg/L	
TIN	R	NP	NP	NP											
(no units available)	T	NP	NP	NP											
URANIUM	R	.5	.002	.127										0.002	.02
mg/L	T	.2	.002	.042										mg/L	mg/L t
VANADIUM	R	.002	.001	.0013										0.001	
mg/L	T	.001	.001	.001										mg/L	
ZINC	R	.043	.004	.015	.089	.002	.0235	.24	.007	.12	.067	.004	.028	0.001	5
mg/L	T	.019	.001	.006	.09	.002	.017	.01	.001	.005	.049	.001	.008	mg/L	mg/L h
PURGEABLES															
BENZENE	R	0	0	0										1	10
ug/L	T	0	0	0										ug/L	ug/L h
BROMOFORM	R	0	0	0										1	350
ug/L	T	0	0	0										ug/L	ug/L ++
CARBON TETRACHLORIDE	R	0	0	0										1	3
ug/L	T	0	0	0										ug/L	ug/L h
CHLOROBENZENE	R	0	0	0										1	100-300
ug/L	T	0	0	0										ng/L	ng/L h*

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

PURGEABLES (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
CHLORODIBROMOMETHANE	R	0	0	0										1	350
ug/L	T	9	4	7										ug/L	ug/L ++
CHLOROFORM	R	0	0	0										1	350
ug/L	T	33	15	24.5										ug/L	ug/L ++
1,2-DICHLOROBENZENE	R	0	0	0										1	400
ug/L	T	0	0	0										ug/L	ug/L e
1,3-DICHLOROBENZENE	R	0	0	0										1	400
ug/L	T	0	0	0										ug/L	ug/L e
1,4-DICHLOROBENZENE	R	0	0	0										1	400
ug/L	T	0	0	0										ug/L	ug/L e
DICHLOROBROMOMETHANE	R	0	0	0										1	350
ug/L	T	14	8	10										ug/L	ug/L ++
1,1-DICHLOROETHANE	R	0	0	0										1	
ug/L	T	0	0	0										ug/L	
1,2-DICHLOROETHANE	R	0	0	0										1	10
ug/L	T	0	0	0										ug/L	ug/L h
1,1-DICHLOROETHYLENE	R	0	0	0										1	.3
ug/L	T	0	0	0										ug/L	ug/L h
T,1,2-DICHLOROETHYLENE	R	0	0	0										1	
ug/L	T	0	0	0										ug/L	

TABLE 5.0

AMHERSTBURG

PLANT WATER SYSTEM

MPOS

WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

PURGEABLES (Cont'd)		19 86			19 85			19 84			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
DICHLOROMETHANE	R	0	0	0										5	40
ug/L	T	0	0	0										ug/L	ug/L c
1,2 DICHLOROPROPANE	R	0	0	0										1	
ug/L	T	0	0	0										ug/L	
ETHYLBENZENE	R	0	0	0										1	1400
ug/L	T	0	0	0										ug/L	ug/L e
ETHYLENE DIBROMIDE	R	0	0	0											
ug/L	T	0	0	0											
M-XYLENE	R	0	0	0										1	620
ug/L	T	0	0	0										ug/L	ug/L c
O-XYLENE	R	0	0	0										1 ug/L	620
ug/L	T	0	0	0											ug/L c
P-XYLENE	R	0	0	0										1	620
ug/L	T	0	0	0										ug/L	ug/L c
TOLUENE	R	0	0	0										1	100
ug/L	T	0	0	0										ug/L	ug/L c
1,1,2,2-TETRACHLOROETHANE	R	0	0	0										1	1.7
ug/L	T	0	0	0										ug/L	ug/L e
TETRACHLOROETHYLENE	R	0	0	0										1	10
ug/L	T	0	0	0										ug/L	ug/L h

TABLE 5.0

AMHERSTBURG
PLANT WATER SYSTEM **WPOS**
WATER QUALITY – 4-YEAR SUMMARY (1984 – 1986 **)**

PURGEABLES (Cont'd)		19 86			19 85			19 84			19 83			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
1,1,1-TRICHLOROETHANE	R	0	0	0										1	1000
ug/L	T	0	0	0										ug/L	ug/L c
1,1,2-TRICHLOROETHANE	R	0	0	0										1	6
ug/L	T	0	0	0										ug/L	ug/L e
TRICHLOROETHYLENE	R	0	0	0										1	30
ug/L	T	0	0	0										ug/L	ug/L h
TOTAL TRIHALOMETHANES	R	0	0	0										3	350
ug/L	T	54	32	42										ug/L	ug/L ++
TRIFLUOROCHLOROTOLUENE	R	0	0	0										1	
ug/L	T	0	0	0										ug/L	
ORGANOCHLORINES															
ALDRIN	R	<1	<1	<1										1	700
ng/L	T	<1	<1	<1										ng/L	ng/L **
ALPHA BHC	R	<3	<1	<2										1	700
ng/L	T	<3	<1	<2										ng/L	ng/L c
ALPHA CHLORDANE	R	<2	<2	<2										2	700
ng/L	T	<2	<2	<2										ng/L	ng/L ***
BETA BHC	R	<1	<1	<1										1	300
ng/L	T	<1	<1	<1										ng/L	ng/L c
DIELDRIN	R	<2	<2	<2										2	700
ng/L	T	<2	<2	<2										ng/L	ng/L **

TABLE 5.0

AMHERSTBURG
PLANT WATER SYSTEM — WPOS WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

ORGANOCHLORINES (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
ENDRIN	R	<4	<4	<4										4	200
ng/L	T	<4	<4	<4										ng/L	ng/L
GAMMA CHLORDANE	R													2	700
ng/L	T													ng/L	ng/L ***
HEPTACHLOR EPOXIDE	R	<1	<1	<1										1	3000 +++
ng/L	T	<1	<1	<1										ng/L	ng/L
HEPTACHLOR	R	<1	<1	<1										1	3000
ng/L	T	<1	<1	<1										ng/L	ng/L +++
HEXACHLOROBENZENE	R	<1	<1	<1										1	10
ng/L	T	<1	<1	<1										ng/L	ng/L h
HEXACHLOROBUTADIENE	R	<1	<1	<1											
ug/L	T	<1	<1	<1											
HEXACHLOROETHANE	R	<1	<1	<1										1	19000
ng/L	T	<1	<1	<1										ng/L	ng/L •
LINDANE	R													1	4000
ng/L	T													ng/L	ng/L
METHOXYCHLOR	R													5	100000
ng/L	T													ng/L	ng/L
MIREX	R	<5	<5	<5										5	
ng/L	T	<5	<5	<5										ng/L	

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

ORGANOCHLORINES (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
OCTACHLOROSTYRENE	R	<1	<1	<1										1	
ng/L	T	<1	<1	<1										ng/L	
O,P-DDT	R	<5	<5	<5										5	30000
ng/L	T	<5	<5	<5										ng/L	ng/L d
OXYCHLORDANE	R	<2	<2	<2										2	
ng/L	T	<2	<2	<2										ng/L	
PCB TOTAL	R	<20	<20	<20										20	3000
ng/L	T	<20	<20	<20										ng/L	ng/L t
PENTACHLOROBENZENE	R													1	74000
ng/L	T													ng/L	ng/L e
P,P-DDD	R	<5	<5	<5										5	d
ng/L	T	<5	<5	<5										ng/L	
P,P-DDE	R	<1	<1	<1										1	d
ng/L	T	<1	<1	<1										ng/L	
P,P-DDT	R	<5	<5	<5										5	d
ng/L	T	<5	<5	<5										ng/L	
1,2,3,4-TETRACHLOROBENZENE	R													1	
ng/L	T													ng/L	
1,2,3,5-TETRACHLOROBENZENE	R	<1	<1	<1										1	
ng/L	T	<1	<1	<1										ng/L	

TABLE 5.0

AMHERSTBURG
PLANT WATER SYSTEM

WPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986 **)**

ORGANOCHLORINES (Cont'd)		19 86			19 85			19 84			19 83			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
1,2,4,5-TETRACHLOROBENZENE	R	<1	<1	<1										1	38000
ng/L	T	<1	<1	<1										ng/L	ng/L e
THIODAN I	R													2	74000
ng/L	T													ng/L	ng/L ea
THIODAN II	R													4	74000
ng/L	T													ng/L	ng/L ea
THIODAN SULPHATE	R													4	
ng/L	T													ng/L	
TOXAPHENE	R	NP	NP	NP											
(no units available)	T	NP	NP	NP											
1,2,3-TRICHLOROBENZENE	R	<5	<5	<5										5	10000
ng/L	T	<5	<5	<5										ng/L	ng/L y
1,2,4-TRICHLOROBENZENE	R	<5	<5	<5										5	15000
ng/L	T	<5	<5	<5										ng/L	ng/L y
1,3,5-TRICHLOROBENZENE	R	<5	<5	<5										5	10000
ng/L	T	<5	<5	<5										ng/L	ng/L y
2,3,6-TRICHLOROTOLUENE	R	<5	<5	<5										5	
ng/L	T	<5	<5	<5										ng/L	
2,4,5-TRICHLOROTOLUENE	R	<5	<5	<5										5	10000
ng/L	T	<5	<5	<5										ng/L	ng/L g

TABLE 5.0

AMHERSTBURG
PLANT WATER SYSTEM

WPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

TRIAZINES		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
TRIAZINES															
2,6,A-TRICHLOROTOLUENE	R	<5	<5	<5										5	
mg/L	T	<5	<5	<5										ng/L	
ALACHLOR	R	<500	<500	<500	<1000	<1000	<1000								
ng/L	T	<500	<500	<500											
AMETRINE	R	80	<50	<51										50	
ng/L	T	<50	<50	<50										ng/L	
ATRATONE	R	390	<50	<71.3											
ng/L	T	<50	<50	<50											
ATRAZINE	R	2230	<50	429										50	46000
ng/L	T	<50	<50	<50										ng/L	ng/L 1
BLADEX	R	630	<100	126.5										100	10000
ng/L	T	<100	<100	<100										ng/L	ng/L 1
METOLACHLOR	R	<500	<500	<500											
ng/L	T	<500	<500	<500											
PROMETONE	R	200	<50	<50										50	
ng/L	T	<50	<50	<50										ng/L	
PROMETRYNE	R	<50	<50	<50										50	1000
ng/L	T	<50	<50	<50										ng/L	ng/L 1
PROPAZINE	R	<50	<50	<50										50	
ng/L	T	<50	<50	<50										ng/L	

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MOS

WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

TRIAZINES (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
SENCOR	R	150	<50	55										100	
ng/L	T	<50	<50	<50										ng/L	
SIMAZINE	R	<100	<100	<100										50	10000
ng/L	T	<100	<100	<100										ng/L	ng/L I
SPECIAL PESTICIDES															
2,4-D	R													100	100000
ng/L	T													ng/L	ng/L
2,4-D BUTYRIC ACID	R													200	18000
ng/L	T													ng/L	ng/L I
DICAMBA	R													100	87000
ng/L	T													ng/L	ng/L I
PENTACHLOROPHENOL	R													50	10000
ng/L	T													ng/L	ng/L h
PICLORAM	R													100	
ng/L	T													ng/L	
2,4-D PROPIONIC ACID	R													100	
ng/L	T													ng/L	
SILVEX	R													50	10000
ng/L	T													ng/L	ng/L
2,4,5-T	R													50	
ng/L	T													ng/L	

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

SPECIAL PESTICIDES (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
2,3,4,5-TETRACHLOROPHENOL	R													50	
ng/L	T													ng/L	
2,3,5,6-TETRACHLOROPHENOL	R													50	
ng/L	T													ng/L	
2,3,4-TRICHLOROPHENOL	R													100	
ng/L	T													ng/L	
2,4,5-TRICHLOROPHENOL	R													50	
ng/L	T													ng/L	
2,4,6-TRICHLOROPHENOL	R													50	10000
ng/L	T													ng/L	ng/L h
ORGANOPHOSPHOROUS PESTICIDES															
DIAZINON	R													50	14000
ng/L	T													ng/L	ng/L
DICHLOROVOS	R														
ng/L	T														
DURSBAN	R														
ng/L	T														
ETHION	R														
ng/L	T														
GUTHION	R														
ng/L	T														

TABLE 5.0

MPOS

PLANT AMHERSTBURG WATER SYSTEM WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

ORGANOPHOSPHOROUS PESTICIDES (Cont'd)		19 86			19 85			19 84			19 83			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE^1
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
MALATHION	R														
ng/L	T														
METHYLPARATHION	R													50	7000
ng/L	T													ng/L	ng/L
METHYLTRITHION	R														
ng/L	T														
MEVINPHOS	R														
ng/L	T														
PARATHION	R													50	35000
ng/L	T													ng/L	ng/L
PHORBATE	R														
ng/L	T														
RELDAN	R														
ng/L	T														
RONNEL	R														
ng/L	T														
MASS SPEC.															
DI-N-BUTYL PHTHALATE	R													0.1	34000
ug/L	T													ug/L	ug/L

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MOS

WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

MASS SPEC. (Cont'd)		1986			1985			1984			1983			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
N-DICHLOROMETHYLENE- PENTACHLOROANALINE	R													0.1	
ug/L	T													ug/L	
DIPHENYL ETHER	R													0.1	
ug/L	T													ug/L	
FLUORANTHENE	R													0.1	
ug/L	T													ug/L	
HEXACHLOROPROPENE	R													0.1	
ug/L	T													ug/L	
METHYL PHENANTHRENE	R													0.1	
ug/L	T													ug/L	
NAPHTHALENE	R													0.1	
ug/L	T													ug/L	
PENTACHLOROBUTADIENE	R													0.1	
ug/L	T													ug/L	
PENTACHLOROPROPANE	R													0.1	
ug/L	T													ug/L	
PENTACHLOROPROPENE	R													0.1	
ug/L	T													ug/L	
PYRENE	R													0.1	
ug/L	T													ug/L	

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM

MPOS
WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

MASS SPEC. (Cont'd)		19 86			19 85			19 84			19 83			OWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE[1]
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
TETRACHLORBUTANE	R													0.1	
ug/L	T													ug/L	
TETRACHLOROBIPHENYL	R													0.1	
ug/L	T													ug/L	
BACTERIA															
RAW WATER:															
TOTAL COLIFORM MF	R														
TOTAL COLIFORM BKGD	R														
FECAL COLIFORM MF count/100mL	R													0	0/0.1 mL
STANDARD PLATE COUNT MF count/mL	R													0	500
TREATED WATER:															
PRESENT/ABSENT TEST	T														
TOTAL COLIFORM BACKGROUND MF count/100mL	T													0	OWDO Bacti
FECAL COLIFORM MF count/100mL	T													0	ODWO Bacti

TABLE 5.0

PLANT AMHERSTBURG WATER SYSTEM MOS WATER QUALITY - 4-YEAR SUMMARY (1984 - 1986)

BACTERIA (Cont'd)		19 86			19 85			19 84			19 83			DWSP DETECTION LIMIT*	DRINKING WATER OBJ/ GUIDELINE^1
		MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE	MAX	MIN	AVE		
TREATED WATER: (Cont'd)															
STANDARD PLATE COUNT MF count/100mL	T														
IF PRESENT/ABSENT TEST POSITIVE:															
COLIFORM P/A	R														
	T														
FECAL COLIFORM P/A	R														
	T														
E. COLI P/A	R														
	T														
AROMONAS P/A	R														
	T														
STAPH. AUREUS P/A	R														
	T														

*If other than DWSP Detection Limit

TABLE 6.0: ALGAE COUNT

		1986	1985	1984	1983
JAN	Max.				
	Min.				
	Avg.				
	No. Tests				
FEB	Max.				
	Min.				
	Avg.				
	No. Tests				
MAR	Max.				
	Min.				
	Avg.				
	No. Tests				
APR	Max.				
	Min.				
	Avg.				
	No. Tests				

Data available at MOE Water Resources Branch

TABLE 6.0: ALGAE COUNT

		1986	1985	1984	1983
MAY	Max.				
	Min.				
	Avg.				
	No. Tests				
JUN	Max.				
	Min.				
	Avg.				
	No. Tests				
JUL	Max.				
	Min.				
	Avg.				
	No. Tests				
AUG	Max.				
	Min.				
	Avg.				
	No. Tests				

Data available at MOE Water Resources Branch

TABLE 6.0: ALGAE COUNT

		1986	1985	1984	1983
SEP	Max.				
	Min.				
	Avg.				
	No. Tests				
OCT	Max.				
	Min.				
	Avg.				
	No. Tests				
NOV	Max.				
	Min.				
	Avg.				
	No. Tests				
DEC	Max.				
	Min.				
	Avg.				
	No. Tests				

Data available at MOE Water Resources Branch

TABLE 7.0: BACTERIOLOGICAL TESTING 1984

		TOTAL COLI				FECAL COLI				FECAL STREP			
		A	B	C	D	A	E	F	G	A	H	I	J
JAN	R		1		7		1	4	5			4	1
	T	10				5							
FEB	R			3	4			4	4			1	3
	T	8				4							
MAR	R			4	3			8					4
	T	8				4							
APR	R		1	6	2			9				5	
	T	9				4							
MAY	R			8	1			9				3	1
	T	9				5							
JUN	R			3	4			8				4	
	T	8				4							
JUL	R			6	2			9				5	
	T	9				4							
AUG	R			5	3			8				4	
	T	8				4							
SEP	R		4	1	3		4	4				3	1
	T	8				4							
OCT	R		2	6	2		2	8				5	
	T	10				5							
NOV	R			4	4			8					4
	T	8				4							
DEC	R			7	2			9					4
	T	9				4							

ALL RESULTS ARE FOR 100mL SAMPLES; TESTS CARRIED OUT AT MOE LAB, LONDON AND WINDSOR MOH LAB

A = ABSENT
B = 1-100
C = 101-5000
D = >5000
E = 0-10
F = 11-500
G = >500
H = 0-1
I = 2-50
J = >50

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 7.0: BACTERIOLOGICAL TESTING 1985

		TOTAL COLI				FECAL COLI				FECAL STREP			
		A	B	C	D	A	E	F	G	A	H	I	J
JAN	R			3	6			8	1			1	3
	T	9				5				1			
FEB	R			5	3			7	1			2	2
	T	8				4							
MAR	R			7	1			8					4
	T	8				4							
APR	R			3	7			9	1			3	2
	T	10				5							
MAY	R			5	3			8				3	1
	T	8				4							
JUN	R			6	2		1	7				3	1
	T	8				4							
JUL	R			8	2			10				4	1
	T	10				5							
AUG	R			5	2			7	1			2	2
	T	8				4							
SEP	R			5				8	1			4	1
	T	9				4							
OCT	R			2	2			8	1			3	1
	T	9				5							
NOV	R				3			5	2				3
	T	6	1			4							
DEC	R				4			6	4			1	4
	T	10				5							

ALL RESULTS ARE FOR 100mL SAMPLES; TESTS CARRIED OUT AT MOE LAB, LONDON AND WINDSOR MOH LAB

A = ABSENT
B = 1-100
C = 101-5000
D = >5000
E = 0-10
F = 11-500
G = >500
H = 0-1
I = 2-50
J = >50

WATER PLANT OPTIMIZATION STUDY
AMHERSTBURG WATER SYSTEM

TABLE 7.0: BACTERIOLOGICAL TESTING 1986

		TOTAL COLI				FECAL COLI				FECAL STREP			
		A	B	C	D	A	E	F	G	A	H	I	J
JAN	R			2	2			5	2			1	3
	T	7				4							
FEB	R			2	2			8					4
	T	8											
MAR	R			2	3			7	2			3	2
	T	9				4							
APR	R			1	3			8	1			2	2
	T	9				5							
MAY	R			1	2			8			1	3	
	T	8				4							
JUN	R			3	2		1	10				5	
	T	10				5							
JUL	R			2	2			8				4	
	T	8				4							
AUG	R				1			3	2			1	
	T	6				4							
SEP	R			4	1			10				4	1
	T	10				5				1			
OCT	R			5				2	3			1	3
	T	7				3							
NOV	R												
	T		1										
DEC	R				3			3	5				3
	T	8				5							

ALL RESULTS ARE FOR 100mL SAMPLES;
TESTS CARRIED OUT AT MOE LAB, LONDON
AND WINDSOR MOH LAB

A = ABSENT
B = 1-100
C = 101-5000
D = >5000
E = 0-10
F = 11-500
G = >500
H = 0-1
I = 2-50
J = >50

TABLE 8.0: ALERT LEVELS (DISTRIBUTION SYSTEM)

DATE	PARAMETER	MEASURED PARAMETER	GUIDELINE LIMIT

No data available.

TABLE 8.1: ALERT LEVELS (TREATED WATER AT PLANT)

DATE	PARAMETER	MEASURED PARAMETER	GUIDELINE LIMIT

No data available.

TABLE 9

DWSP RESULTS

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
1,1 DICHLOROETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.10	10.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,1 DICHLOROETHYLENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.10	.300
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,2 DICHLOROBENZENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	400.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,2 DICHLOROETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	NONE
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,2 DICHLOROPROPANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	6.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,3 DICHLOROBENZENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.10	400.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1,4 DICHLOROBENZENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.01	400.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
111, TRICHLOROETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.02	NONE
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
112 TRICHLOROETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	6.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
1122 T-CHLOROETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	1.70
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
123 TRICHLOROBENZENE	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000	10000.00
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W		
1234 T-CHLOROBENZENE	NG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	38000.00
		T	1.000 <W	3.000 <T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	3.000 <T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W		

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
1235 T-CHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 10.000	1.000 <W 1.000 <W	1.000 <W 5.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	15000.000
124 TRICHLOROBENZENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	16.000 <T 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 12.000 <T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	NONE
1245 T-CHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 15.000	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 7.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	38000.000
135 TRICHLOROBENZENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 9.000 <T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	10000.000
2,4 D PROPIONIC ACID	NG/L	R T				100.00 <W 100.00 <W									100.00	NONE
2,4,5-T	NG/L	R T				50.000 <W 50.000 <W									50.00	NONE
2,4-D	NG/L	R T				100.00 <W 100.00 <W									100.00	110000.000
234 TRICHLOROPHENOL	NG/L	R T				100.00 <W 100.00 <W									100	NONE
2345 T-CHLOROPHENOL	NG/L	R T				50.000 <W 50.000 <W									20	NONE
2356 T-CHLOROPHENOL	NG/L	R T				50.000 <W 50.000 <W									10	NONE
236 TRICHLOROTOLUENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 19.000 <T	5.000 <W 13.000 <T	5.000 <W 5.000 <W	5.000 <W 25.000 <T	5.000 <W 17.000 <T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	NONE

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
245 TRICHLOROTOLUENE	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000	10000.00
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W		
245-TRICHLOROPHENOL	NG/L	R				50.000 <W									100	NON
		T				50.000 <W										
246-TRICHLOROPHENOL	NG/L	R				50.000 <W									20	10000.00
		T				50.000 <W										
24DCHLRPHENOXYBUTYRC	NG/L	R				200.00 <W									200.00	NON
		T				200.00 <W										
26A TRICHLOROTOLUENE	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000	NON
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W		
AERONOMAS SP	0=ABSENT	R														.00
		T											.000			
ALDRIN	NG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	1400.00
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W		
ALKALINITY	MG/L-CAC	R	84.000	82.400	86.600	85.000	91.400	85.200	107.80	107.00 000	89.400	83.800	84.600	88.000	0.2	NON
		T	66.600	68.400	75.400	71.600	70.400	67.800	67.000	86.000 000	78.200	84.200	63.400	77.400		
ALPHA BHC	NG/L	R	1.000 <W	1.000 <W	3.000 <T	2.000 <T	2.000 <T	2.000 <T	2.000 <T	3.000 <T	1.000 <T	4.000 <T	2.000 <T	2.000 <T	1.000	700.00
		T	3.000 <T	1.000 <W	2.000 <T	2.000 <T	3.000 <T	2.000 <T	1.000 <W	1.000 <W	1.000 <T	1.000 <T	2.000 <T	2.000 <T		
ALPHA CHLORDANE	NG/L	R	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000	1400.00
		T	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W		
ALUMINUM	MG/L-AL	R	.250	.033	.210	.190	.990	.570	9.100	1.200 000	.059	.049	.098	.073	0.01	.10
		T	.039	.069	.093	.056	.038	.068	.090	.036 000	.047	.040	.089	.047		
AMETRINE	NG/L	R				50.000 <W									50.00	NON
		T				50.000 <W										

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
AMMONIUM TOTAL	MG/L-N	R T	.050 <W .050 <W	.050 <W .050 <W	.050 <W .050 <W	.050 <W .050 <W		.050 <W .050 <W	.050 <W .050 <T	.050 <W .050 <W	.054 .006 <T	.020 .002 <T	.078 .002 <T	.046 .010	0.002	NON
ARSENIC	MG/L-AS	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 .001 <	.001 000 .001 <	.001 < .001 <	.001 .001 <	.001 < .001 <	.001 < .001 <	0.001	.05
ATRAZINE	MG/L	R T				50.000 <W 50.000 <W									50.00	46000.00
BARIUM	MG/L-BA	R T	.012 .011	.013 .013	.016 .014	.013 .012	.017 .015	.014 .013	.056 .014	.019 000 .015 000	.012 .013	.012 .012	.012 .013	.012 .012	0.001	1.00
BENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	2.000 .000 SPS	.000 <W .000 SPS	1.000 .000 <W	.000 <W .000 <W	0.05	10.00
BERYLLIUM	MG/L-BE	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.005 < .005 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	0.005	NON
BETA BHC	MG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 4.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <T 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	700.00
BLADEX	MG/L	R T				100.00 <W 100.00 <W									100.00	NON
BORON	MG/L-BO	R T	.060 .050	.100 .100	.050 < .050 <	.030 .080	.020 < .020 <	.080 .050	.040 .060	.030 000 .020 <	.020	.030 .060	.060 .020 <	.020 < .020 <	0.005	5.00
BROMOFORM	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.2	700.00
CADMIUM	UG/L-CD	R T	.200 < .200 <	.300 < .300 <	.200 < .200 <	.300 < .300 <	.200 < .200 <	.300 < 3.000 <	.900 < .200 <	.200 000 .200 <	.200 < .200 <	.200 < .200 <	.200 < .200 <	.200 < .200 <	2.000	5.000

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OB.
CALCIUM	MG/L-CA	R T	26.500 26.800	27.200 28.400	29.600 30.000	30.000 30.000	34.600 37.000	31.000 33.500	42.000 34.800	40.200 000 42.000 000	30.500 31.500	29.000 29.000	29.500 31.000	30.800 30.500	0.2	NON
CARBON TETRACHLORIDE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.2	3.00
CHLORIDE	MG/L-CL	R T	10.400 10.400	8.800 12.800	9.600 12.400	10.600 19.800	22.400 22.400	17.600 20.200	21.000 19.400	26.200 000 27.600 000	30.800 34.400	25.400 27.200	28.000 28.800	24.800 28.200	0.5	250.00
CHLOROBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.1	100.00
CHLORODIBROMOMETHANE	UG/L	R T	.000 <W 5.000	.000 <W 15.000	.000 <W 15.000	.000 <W 8.000	.000 <W 9.000	.000 <W 9.000	.000 <W 6.000 APS	.000 <W 9.000 000	.000 <W 14.000	.000 <W 8.000	.000 <W 12.000	.000 <W 13.000	0.1	353.00
CHLOROFORM	UG/L	R T	.000 <W 21.000	.000 <W 38.000	.000 <W 31.000	.000 <W 20.000	.000 <W 26.000	.000 <W 17.000	.000 <W 16.000 APS	.000 <W 15.000 000	.000 <W 24.000	.000 <W 13.000	.000 <W 26.000	.000 <W 25.000	0.1	350.00
CHROMIUM	MG/L-CR	R T	.003 .002	.001 < .001 <	.002 .001	.002 .001	.003 .002	.003 .002	.017 .002	.004 000 .002 000	.001 .002	.002 .001	.001 .001	.002 .001	.5UG/L	50.00
COBALT	MG/L-CO	R T	.001 < .001 <	.001 < .001 <	.001 .001 <	.001 < .001 <	.001 .001 <	.001 .001 <	.009 .001 <	.002 000 .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.5UG/L	NON
COLIFORM	0=ABSENT	R T											 .000			.00
COLOUR		R T	3.000 1.000 <T	4.000 .500 <T	6.000 .500 <T	7.000 .500 <T	22.500 .500 <T	7.500 .500 <T	80.000 1.500 <T	20.000 000 .500 <T					0.5	5.00
COLOUR	HZU	R T									7.000 .500 <W	3.500 .500 <W	13.000 1.000 <T	6.500 .500 <T	0.5	5.00
CONDUCTIVITY	UMHO/CM	R T	232.00 238.00	230.00 246.00	238.00 258.00	238.00 269.00	310.00 323.00	270.00 300.00	349.00 306.00	352.00 000 368.00 000	316.00 329.00	284.00 292.00	300.00 318.00	299.00 302.00	1.0	NON

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
COPPER	MG/L-CU	R	.007	.004	.005	.006	.006	.008	.020	.008 000	.004	.003	.003	.003	.5UG/L	1.00
		T	.002	.001	.001 <	.003	.003	.013	.004	.005 000	.002	.002	.003	.003		
CYANIDE	MG/L-CN	R	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	0.001	.40
		T	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W		
DDD	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000	NON
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W		
DICAMBA	NG/L	R				100.00 <W									100.00	NON
		T				100.00 <W										
DICHLOROBROMOMETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	700.00
		T	10.000	14.000	13.000	9.000	12.000	10.000	7.000 APS	10.000 000	12.000	8.000	9.000	14.000		
DIELDRIN	NG/L	R	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000	1400.00
		T	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W		
ENDRIN	NG/L	R	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000	400.00
		T	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W		
ETHYLBENZENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	1400.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
FECAL COLIFORM	0=ABSENT	R														.00
		T											.000			
FECAL COLIFORM MF	CT/100ML	R	118.00		124.00	176.00	300.00 >				600.00 >	600.00 >	600.00 >			.00
		T														
FLD CHLORINE (COMB)	MG/L-CL	R														NON
		T		.100	.200	.200	.100		.100	.250 000	.100	.100	.200	.100		

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
FLD CHLORINE (TOTAL)	MG/L-CL	R														NON
		T		.900	1.000	1.000	.900	.800	.900	.900 000	.900	.900	.800	.900		
FLD CHLORINE FREE	MG/L-CL	R														NON
		T		.800	.800	.800	.800	.800	.800	.650 000	.800	.800	.600	.800		
FLD PH		R	7.700	7.700	7.700	7.800	8.100	7.600	7.800	7.900 000	7.700	8.200	7.600	7.600		NON
		T		7.200	7.100	7.100	7.200	6.800	7.100	7.000 000	7.100	7.100	7.100	7.200		
FLD TEMPERATURE	DEG.C	R	14.000	22.000	21.000	14.000	9.000	7.000	5.000	2.000 000	.500	.100	1.000	1.000		NON
		T		22.000	20.000	14.000	8.000	6.000	5.000	3.000 000	1.000	2.000	2.000	2.000		
FLD TURBIDITY	FTU	R	7.700	6.100	7.300	5.300	23.000	24.200	112.00	34.000 000	2.300	1.700	4.800	4.800		NON
		T		.120	.170	.040	.050	.230	.270	38.000 000	.150	.110	.130	.120		
FLUORIDE	MG/L-F	R	.090	.090	.100	.110	.140	.100	.160	.120 000	.140	.080	.090	.100	0.01	2.40
		T	1.150	1.040	1.170	1.020	.970	1.200	1.110	1.080 000	1.080	1.120	1.170	1.250		
GAMMA CHLORDANE	MG/L	R	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000	7700.00
		T	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W		
HARDNESS	MG/L-CAC	R	95.400	97.100	104.80	105.00	123.00	110.00	149.00	140.00 000	109.00	103.70	107.00	111.00		500.00
		T	96.100	100.60	106.60	106.00	130.00	117.00	122.00	144.00 000	112.00	103.70	111.20	108.30		
HCB	MG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	3.000 <T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	NON
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W		
HEPTACHLOR	MG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	3000.00
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	5.000 <T	1.000 <W	1.000 <W	25.000	1.000 <W	1.000 <W	1.000 <W		
HEPTACHLOR EPOXIDE	MG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	6000.00
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W		
HEXACHLOROBUTADIENE	MG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000	4500.00
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W		

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OBJ
HEXACHLOROETHANE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 5.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	19000.00
IRON	MG/L-FE	R T	.490 .010 <T	.110 .013	.250 .002 <	.270 .002 <	.940 .002 <	.560 .014	9.800 .025	1.200 000 .004 000	.045 .003 <	.032 .003 <	.085 .004	.051 .003 <	0.02	.30
LEAD	MG/L-PB	R T	.003 < .003 <	.003 < .003 <	.003 < .003 <	.003 < .003 <	.003 < .003 <	.003 < .003 <	.018 .003 <	.005 000 .003 <	.003 < .003 <	.003 < .003 <	.003 < .003 <	.003 < .003 <	0.005	.05
LINDANE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	2.000 <T 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.00	8000.00
M-XYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.1	620.00
MAGNESIUM	MG/L-MG	R T	7.100 7.100	7.200 7.200	7.500 7.700	7.400 7.500	8.850 9.100	7.800 8.200	10.800 8.400	9.700 000 9.600 000	7.900 8.100	7.600 7.600	8.100 8.200	8.300 7.800	0.1	NON
MANGANESE	MG/L-MN	R T	.015 <T .005 <T	.007 .001 <W	.010 .001 <	.009 .001	.013 .003	.001 < .002	.130 .003	.018 000 .004 000	.003 .002	.003 .001	.005 .003	.003 .002	.5UG/L	.05
MERCURY	UG/L-HG	R T	.010 < .010 <	.010 < .010 <	.010 .010	.010 < .010 <	.010 .010	.010 .010 <	.100 .010 <	.010 000 .010 <	.010 .010	.010 .010 <	.010 < .010 <	.010 < .010 <	0.010	1.000
METHOXYCHLOR	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	200000.000
METHYLENE CHLORIDE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL		.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W	.000 <W .000 <W	0.5	40.000
MIREX	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	NONE

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OB.
			85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28		
MOLYBDENUM	MG/L-MB	R T	.002 .001 <	.001 <W .001 <W	.001 .001	.002 .002	.001 .001	.001 .001	.001 < .001	.002 000 .002 000	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.5UG/L	NO
NICKEL	MG/L-NI	R T	.001 .001 <	.002 < .002 <	.001 .001	.001 .001	.003 .001	.002 .001	.015 .002	.004 000 .003 000	.001 < .001	.001 < .001	.001 .001	.002 .001	0.002	NO
NITRITE	MG/L-N	R T	.015 <T .005 <W	.020 <T .010 <T	.020 <T .005 <W	.015 <T .005 <W	.015 <T .005 <W	.015 <T .005 <W	.070 .005 <W	.040 <T .005 <W	.006 .000 <W	.004 .000 <W	.008 .000 <T	.005 .002	0.001	1.0
NITROGEN TOT KJELD	MG/L-N	R T	.300 <T .200 <T	.600 <T .400 <T	.300 <T .100 <T	.300 <T .200 <T		.300 .100	1.750 .200 <T	.400 <T .200 <T	.240 .130	.190 .060 <T	.280 .110	.200 .120	0.02	NO
O-XYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.05	620.0
OCTACHLOROSTYRENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	NON
OPDDT	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	60000.00
OXYCHLORDANE	NG/L	R T	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000	NON
P-XYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.1	620.00
P/A BOTTLE	0=ABSENT	R T	 .000	 .000	 .000	 .000	 .000	 .000	 .000	 .000 000	 .000	 .000	 .000 72P	 .000		.00
PCB	NG/L	R T	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000 <W 20.000 <W	20.000	6000.00
PENTACHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 4.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	3.000 <T 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	74000.00

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OBJ
PENTACHLOROPHENOL	NG/L	R T				50.000 <W 50.000 <W									10	10000.00
PH		R T	8.220 7.200	8.220 7.370	8.450 7.440	8.290 7.450	8.240 7.290	7.990 7.220	7.900 6.960	8.160 000 7.240 000	8.040 7.280	8.050 7.400	8.020 6.890	7.790 7.320		8.50
PHOSPHORUS FIL REACT	MG/L-P	R T	.020 <T .010 <W	.010 <W .010 <W	.050 <W .010 <W	.010 <W .010 <W		.010 <W .010 <W	.060 <T .010 <T	.010 <W .010 <W	.006 .004	.006 .002 <T	.013 .011	.006 .013	.5UG/L	NON
PHOSPHORUS TOTAL	MG/L-P	R T	.010 <W .010 <W	.060 <T .040 <T	.040 <T .010 <W	.020 <T .010 <W		.080 <T .020 <T	.420 .010 <W	.070 <T .010 <W	.013 .006	.009 .009	.022 .010	.015 .014	0.002	NON
PICHLORAM	NG/L	R T				100.00 <W 100.00 <W									100.00	NON
PPDDE	NG/L	R T	2.000 <T 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000	30000.00
PPDDT	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000	30000.00
PROMETONE	NG/L	R T				50.000 <W 50.000 <W									50.00	NON
PROMETRYNE	NG/L	R T				50.000 <W 50.000 <W									50.00	NON
PROPAZINE	NG/L	R T				50.000 <W 50.000 <W									50.00	NON
SELENIUM	MG/L-SE	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	0.001	.01

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OB
SENCOR	MG/L	R T				100.00 <W 100.00 <W									100.00	NO
SILVEX	MG/L	R T				50.000 <W 50.000 <W									50.00	20000.0
SIMAZINE	MG/L	R T				50.000 <W 50.000 <W									50.00	NO
SODIUM	MG/L-NA	R T	7.000 6.200	6.200 7.400	6.400 7.400	6.600 11.800	13.500 12.300	10.800 12.000	11.600 10.200	15.400 000 15.500 000	19.800 21.500	16.500 17.000	17.500 17.000	16.000 15.500	0.2	NO
STANDARD PLATE CNT MF	CT/ML	R T	1800.0 280.00	2400.0 > 1.000	 2.000	 9.000	2400.0 > 1.000	2400.0 > 1.000	2400.0 > 4.000		580.00	1000.0	2400.0 >			NO
STAPH AUREUS	0=ABSENT	R T											 .000			.0
STRONTIUM	MG/L-SR	R T	.099 .098	.100 .110	.110 .110	.220 .100	.130 .130	.100 .110	.190 .120	.140 000 .140 000	.110 .110	.100 .100	.120 .130	.097 .100	0.001	NON
T COLIFORM BCKGRD MF	CT/100ML	R T	16500 .000	90000 .000	4900.0 .000	4600.0 1.000	110000 11.000	58000 .000	96000 2.000	31000 000 .000 000	10600 .000	21000 .000	240000 .000	20000 .000		NON
T-CHLOROETHYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.05	10.00
T1,2DICHLOROETHYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 APL	.000 <W .000 <W	.000 <W .000 APS	.000 <W .000 <W	.000 <W .000 SPS	.000 <W .000 SPS	.000 <W .000 <W	.000 <W .000 <W	0.1	NON
THIODAN I	NG/L	R T	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000	740000.00
THIODAN II	NG/L	R T	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000	74000.00

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OBJ
THIODAN SULPHATE	MG/L	R	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000	NON
		T	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W		
TOLUENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.05	14300.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
TOTAL COLIFORM MF	CT/100ML	R	1800.0	300.00 A3C	1800.0	800.00	1800.0 A3C	4900.0 A3C	1400.0 A3C	7600.0 A3C	4600.0	0100.0	3100.0 A3C	6700.0		NON
		T	.000	.000	.000	.000	2.000	.000	.000	.000 000	.000	.000	.000	.000		
TOTAL NITRATES	MG/L-N	R			.300 <T	.300 <T	.650	.550	2.000	1.550 000	.510	.370	.525	.495	0.02	10.00
		T			.300 <T	.300 <T	.900	.900	.900	1.550 000	.580	.390	.580	.480		
TOTAL SOLIDS	MG/L	R	151.00 CRO	144.00 CRO	155.00 CRO	155.00 CRO	221.00	176.00	556.00	241.00 000	205.00 CRO	185.00 CRO	195.00 CRO	194.00 CRO	2.0	500.00
		T	155.00 CRO	160.00 CRO	168.00 CRO	175.00 CRO	210.00 CRO	195.00	199.00 CRO	239.00 CRO	214.00 CRO	190.00 CRO	207.00 CRO	196.00 CRO		
TOTL TRIHALOMETHANES	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.2	350.00
		T	36.000	67.000	59.000	37.000	47.000	36.000	29.000 APS	34.000 000	50.000	29.000	47.000	52.000		
TRICHLOROETHYLENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.1	30.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
TRIFLUOROCHLOROTOLUE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	0.1	NON
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 APL	.000 <W	.000 APS	.000 <W	.000 SPS	.000 SPS	.000 <W	.000 <W		
TURBIDITY	FTU	R	9.800	5.300	9.000	10.900	32.000	20.000	200.00 >	48.000 000	2.900	1.800	6.000	2.900	0.02	1.00
		T	.430 <T	.100 <T	.190 <T	.100 <T	.270 <T	.170 <T	.160 <T	.160 <T	.090 <T	.060 <T	.160 <T	.080 <T		
URANIUM	MG/L-U	R	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	0.1 UG/L	.02
		T	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <	.002 <		
VANADIUM	MG/L-V	R	.001	.001 <W	.001 <	.001 <	.001	.001	.021	.002 000	.001 <	.001 <	.001 <	.001 <	.5UG/L	NON
		T	.001	.001	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <		

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 85/05/23	85/08/26	85/09/23	85/10/28	85/11/21	85/11/25	85/12/02	85/12/10	86/01/07	86/01/14	86/01/21	86/01/28	DETECTION LIMIT	DRINKING WATER OBJ
ZINC	MG/L-ZN	R	.006 <	.003	.003	.005	.007	.007	.051	.010 000	.004	.005	.004	.003	.5UG/L	5.00
		T	.001 <	.001	.010	.002	.002	.007	.002	.002 000	.003	.005	.004	.005		

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
1,1 DICHLOROETHANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.10	10.00
1,1 DICHLOROETHYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.10	.30
1,2 DICHLOROBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	400.00
1,2 DICHLOROETHANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	NONE
1,2 DICHLOROPROPANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	6.00
1,3 DICHLOROBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.10	400.00
1,4 DICHLOROBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.01	400.00
111, TRICHLOROETHANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.02	NONE
112 TRICHLOROETHANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	6.00
1122 T-CHLOROETHANE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	1.700
123 TRICHLOROBENZENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	10000.000
1234 T-CHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W				1.000	38000.000

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
1235 T-CHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W				1.000	15000.00
124 TRICHLOROBENZENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	NON
1245 T-CHLOROBENZENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 6.000 <T				1.000	38000.00
135 TRICHLOROBENZENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	10000.00
236 TRICHLOROTOLUENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 8.000 <T				5.000	NON
245 TRICHLOROTOLUENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 36.000 <T				5.000	10000.00
26A TRICHLOROTOLUENE	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	NONE
ALACHLOR	NG/L	R T								500.00 <W 500.00 <W				500	NONE
ALDRIN	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W				1.000	1400.000
ALKALINITY	MG/L-CAC	R T	90.400 77.800	89.200 74.400	89.600 59.300	113.50 82.300	97.300 78.900	96.500 78.300	86.800 70.500	96.700 80.700				0.2	NONE
ALPHA BHC	NG/L	R T	2.000 <T 1.000 <W	2.000 <T 2.000 <T	3.000 <T 3.000 <T	3.000 <T 2.000 <T	1.000 <W 1.000 <W	3.000 <T 1.000 <W	3.000 <T 4.000 <T	2.000 <T 1.000 <W				1.000	700.000

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
ALPHA CHLORDANE	NG/L	R T	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W				2.000	1400.00
ALUMINUM	MG/L-AL	R T	.160 .038	.130 .034	1.500 .058	2.300 .044	.740 .043	.400 .064	.540 .066	.650 .023				0.01	.10
AMETRINE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
AMMONIUM TOTAL	MG/L-N	R T	.056 .006 <T	.028 .002 <T	.056 .006 <T	.050 .008	.032 .016	.020 .020	.044 .012	.002 <T .004 <T				0.002	NONE
ARSENIC	MG/L-AS	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <				0.001	.05
ATRATONE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
ATRAZINE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	46000.000
BARIUM	MG/L-BA	R T	.013 .013	.013 .012	.019 .013	.016 .014	.017 .014	.017 .016	.018 .016	.017 .012				0.001	1.000
BENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	10.000
BERYLLIUM	MG/L-BE	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <				0.005	NONE
BETA BHC	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W				1.000	700.000
BLADEX	NG/L	R T						100.00 <W 100.00 <W		100.00 <W 100.00 <W				100.00	NONE

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
BORON	MG/L-BO	R T	.020 < .020 <	.020 .020	.020 .020 <	.080 < .080 <	.080 < .080 <	 .030	.020 .020	.020 .030				0.005	5.00
BROMOFORM	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.2	700.00
CADMIUM	UG/L-CD	R T	.200 < .200 <	.200 < .200 <	.200 < .200 <	.200 < .200 <	.300 < .300 <	.400 < .300 <	.300 < .300 <	.300 < .300 <				2.000	5.00
CALCIUM	MG/L-CA	R T	32.500 34.000	32.000 32.100	33.000 28.500	43.600 40.200	33.900 31.600	32.600 32.100	32.700 32.500	34.400 34.300				0.2	NON
CARBON TETRACHLORIDE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.2	3.00
CHLORIDE	MG/L-CL	R T	24.600 25.000	16.000 19.200	22.500 14.600	21.750 22.400	14.700 14.500	13.850 14.000	12.500 13.500					0.5	250.00
CHLORIDE	MG/L-CL-	R T								31.000 RVU 29.000 RVU				0.5	250.00
CHLOROBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.1	100.00
CHLORODIBROMOMETHANE	UG/L	R T	.000 <W 9.000	.000 <W 7.000	.000 <W 10.000	.000 <W 8.000	.000 <W 9.000	.000 <W 7.000	.000 <W 7.000	.000 <W 4.000				0.1	353.00
CHLOROFORM	UG/L	R T	.000 <W 16.000	.000 <W 17.000	.000 <W 16.000	.000 <W 31.000	.000 <W 15.000	.000 <W 24.000	.000 <W 33.000	.000 <W 19.000				0.1	350.00
CHROMIUM	MG/L-CR	R T	.002 002	.002 .001	.004 .002	.004 .001	.001 .001 <	.001 < .001 <	.001 .001 <	.001 .001 <				.5UG/L	50.00

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
CL4 BIPHENYL	UG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W								1.000	NON
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W									
COBALT	MG/L-CO	R	.001 <	.001 <	.002	.001 <	.001 <	.001 <	.001 <	.001 <				.5UG/L	NON
		T	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <	.001 <					
COLOUR	HZU	R	9.000	8.500	18.000	21.000	5.000	3.500	7.500	8.000				0.5	5.00
		T	.500 <W	.500 <W	1.500 <T	.500 <T	.500 <W	.500 <T	.500 <T	1.000 <T					
CONDUCTIVITY	UMHO/CM	R	304.00	272.00	301.00	351.00	273.00	270.00	247.00	339.00				1.0	NON
		T	313.00	287.00	258.00	336.00	265.00	273.00	250.00	334.00					
COPPER	MG/L-CU	R	.006	.004	.016	1.100	.002	.004	.004	.002				.5UG/L	1.00
		T	.009	.003	.003	.007	.002	.001 <W	.001	.001 <W					
CYANIDE	MG/L-CN	R	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W				0.001	.40
		T	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W	.001 <W					
DDD	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W				5.000	NONE
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W					
DI-N-BUTYL PHTHALATE	UG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W								1.000	NONE
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W									
DICHLOROBROMOMETHANE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.05	700.000
		T	9.000	10.000	8.000	10.000	8.000	13.000	14.000	10.000					
DIELDRIN	NG/L	R	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W				2.000	1400.000
		T	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W					
DIPHENYL ETHER	UG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W								1.000	NONE
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W									
ENDRIN	NG/L	R	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W				4.000	400.000
		T	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W					

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE											DETECTION LIMIT	DRINKING WATER OBJ
			86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15					
ETHLYENE DIBROMIDE	UG/L	R T					.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	NON
ETHYLBENZENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	1400.00
FECAL COLIFORM MF	CT/100ML	R T		108.00	300.00 >	78.000	700.00	21.000	480.00	300.00 >					.00
FLD CHLORINE (COMB)	MG/L-CL	R T	.200	.200	1.000	.130	.200	.100	.100	.090					NON
FLD CHLORINE (TOTAL)	MG/L-CL	R T	.900	.800	1.000	1.000	1.000	.900	.900	.870					NON
FLD CHLORINE FREE	MG/L-CL	R T	.700	.600	.900	.870	.800	.800	.800	.780					NON
FLD PH		R T	7.800 7.200	7.600 7.000	7.600 7.000	7.700 7.000	7.900 7.100	7.900 7.100	7.900 7.000	7.500 7.000					NON
FLD TEMPERATURE	DEG.C	R T	1.000 2.000	1.000 2.000	1.500 3.000	5.000 9.500	7.000 10.000	11.000 15.000	16.000 20.000	1.000 4.000					NON
FLD TURBIDITY	FTU	R T	5.500 .150	4.300 .100	34.000 .110	16.000 .160	15.000 .170	8.600 .140	14.000 .140	20.000 .150					NON
FLUORANTHENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NON
FLUORIDE	MG/L-F	R T	.100 1.110	.100 .920	.140 1.060	.110 1.130	.080 1.140	.120 1.320	.110 1.180	.110 .090				0.01	2.40

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15					DETECTION LIMIT	DRINKING WATER OBJ
GAMMA CHLORDANE	NG/L	R T	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W					2.000	7700.00
HARDNESS	MG/L-CAC	R T	115.00 120.00	113.00 114.00	118.60 102.50	146.50 135.00	118.50 112.00	115.50 113.00	115.00 113.50	120.00 119.50						500.00
HCB	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W					1.000	NON
HEPTACHLOR	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W					1.000	3000.00
HEPTACHLOR EPOXIDE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W					1.000	6000.00
HEXACHLOROBUTADIENE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W					1.000	4500.00
HEXACHLOROETHANE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 17.000	1.000 <W 18.000	1.000 <W 1.000 <W					1.000	19000.00
HEXACHLOROPROPENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W									1.000	NON
IRON	MG/L-FE	R T	.150 .003 <	.120 .003 <	1.400 .010	.640 .003 <	.820 .001 <	.420 .002	.620 .002	.640 .002					0.02	.30
LEAD	MG/L-PB	R T	.003 < .003 <	.003 < .003 <	.004 .003 <	.004 .003 <	.003 .003 <	.004 < .003 <	.003 < .003 <	.003 < .003 <					0.005	.05
LINDANE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W					1.00	8000.000
M-XYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W					0.1	620.000

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS 06/15/87

PARAMETERS	UNITS		SAMPLE DATE											DETECTION LIMIT	DRINKING WATER OBJ
			86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15					
MAGNESIUM	MG/L-MG	R T	8.300 8.400	8.100 8.200	8.800 7.600	9.100 8.400	8.150 7.950	8.300 8.000	8.050 7.800	8.300 8.250				0.1	NON
MANGANESE	MG/L-MN	R T	.005 .002	.005 .002	.020 .004	.011 .002	.016 .001	.012 .001	.016 .001	.010 .001				.5UG/L	.05
MERCURY	UG/L-HG	R T	.010 .010	.010 .010 <	.010 < .010 <	.010 .010 UMP	.010 .010 <	.010 <	.010 < .010 <	.010 .010 <				0.010	1.00
METHOXYCHLOR	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	200000.00
METHYL PHENANTHRENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE
METHYLENE CHLORIDE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	 .000 <W	 .000 <W	 .000 <W	.000 <W	.000 <W	.000 <W .000 <W				0.5	40.00
METOLACHLOR	NG/L	R T								500.00 <W 500.00 <W				500	NONE
MIREX	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	NONE
MOLYBDENUM	MG/L-MB	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 <W .001 <W	.001 <W .001 <W	.001 <W .001 <W	.001 <W .001 <W				.5UG/L	NONE
N-CL2METHYLENECL5ANA	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE
NAPHTHALENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
NICKEL	MG/L-NI	R	.002	.001 <	.003	.002	.003	.002 <	.002 <	.002 <				0.002	NONE
		T	.003	.001 <	.001	.001	.002 <	.002 <	.002 <	.002 <					
NITRITE	MG/L-N	R	.005	.005	.022	.084	.012	.013	.017	.002 <T				0.001	1.00
		T	.001 <T	.000 <T	.003	.008	.000	.004	.000 <W	.001 <W					
NITROGEN TOT KJELD	MG/L-N	R	.250	.240	.470	.590	.340	.340	.340	.240				0.02	NONE
		T	.100	.140	.060 <T	.170	.100	.170	.120	.060 <T					
O-XYLENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.05	620.00
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W					
OCTACHLOROSTYRENE	NG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W				1.000	NONE
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W					
OPDDT	NG/L	R	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W				5.000	60000.000
		T	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W	5.000 <W					
OXYCHLORDANE	NG/L	R	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W				2.000	NONE
		T	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W	2.000 <W					
P-XYLENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.1	620.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W					
P/A BOTTLE	0=ABSENT	R													.000
		T	.000	.000	.000	.000	.000	.000	.000	.000					
PCB	NG/L	R	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W				20.000	6000.000
		T	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W	20.000 <W					
PENTACHLOROBENZENE	NG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W				1.000	74000.000
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W	1.000 <W					
PENTACHLOROBUTADIENE	UG/L	R	1.000 <W	1.000 <W	1.000 <W	1.000 <W								1.000	NONE
		T	1.000 <W	1.000 <W	1.000 <W	1.000 <W									

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
PENTACHLOROPROPANE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE
PENTACHLOROPROPENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE
PH		R T	7.950 7.060	8.120 7.280	8.150 7.490	8.140 7.470	8.340 7.800	8.300 7.500	8.230 7.870	8.210 8.090					8.500
PHOSPHORUS FIL REACT	MG/L-P	R T	.006 .009	.003 .008	.023 .013	.027 .017	.004 .011	.006 .012	.007 .004	.010 .000 <W				.5UG/L	NONE
PHOSPHORUS TOTAL	MG/L-P	R T	.016 .011	.017 .012	.069 .008	.064 .015	.052 .014	.034 .016	.038 .009	.043 .003 <T				0.002	NONE
PPDDE	NG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W				1.000	30000.000
PPDDT	NG/L	R T	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W	5.000 <W 5.000 <W				5.000	30000.000
PROMETONE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
PROMETRYNE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
PROPAZINE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
PYRENE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
SELENIUM	MG/L-SE	R T	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <	.001 < .001 <				0.001	.010
SENCOR	NG/L	R T						100.00 <W 100.00 <W		100.00 <W 100.00 <W				100.00	NONE
SIMAZINE	NG/L	R T						50.000 <W 50.000 <W		50.000 <W 50.000 <W				50.00	NONE
SODIUM	MG/L-NA	R T	15.500 14.500	10.200 11.000	12.500 7.400	11.800 11.200	8.600 8.300	8.700 8.500	8.200 7.400	18.500 16.400				0.2	NONE
STANDRD PLATE CNT MF CT/ML		R T	2400.0 > 4.000		 4.000	1200.0 1.000	2400.0 > 1.000	2400.0 > 1.000	2400.0 >	2400.0 > .000 AW					NONE
STRONTIUM	MG/L-SR	R T	.120 .120	.120 .110	.130 .110	.150 .130	.120 .110	.120 .120	.110 .110	.120 .100				0.001	NONE
T COLIFORM BCKGRD MF CT/100ML		R T	14000 .000	17500 .000	49000 .000	6400.0 .000	32000 .000	6500.0 .000	45000 .000	[illegible] .000					NONE
T-CHLOROETHYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.05	10.000
T1,2DICHLOROETHYLENE	UG/L	R T	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W	.000 <W .000 <W				0.1	NONE
TETRACHLOROBUTANE	UG/L	R T	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W	1.000 <W 1.000 <W								1.000	NONE
THIODAN I	NG/L	R T	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W	2.000 <W 2.000 <W				2.000	740000.000
THIODAN II	NG/L	R T	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W	4.000 <W 4.000 <W				4.000	74000.000

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE 86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15				DETECTION LIMIT	DRINKING WATER OBJ
THIODAN SULPHATE	NG/L	R	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W				4.000	NONE
		T	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W	4.000 <W					
TIN	MG/L-SN	R								.000 NP					NONE
		T								.000 NP					
TOLUENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.05	14300.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W					
TOTAL COLIFORM MF	CT/100ML	R	7800.0	2000.0	2800.0 A3C	1800.0	9100.0 A3C	800.00	4400.0 A3C	5300.0 A3C					NONE
		T	.000	.000	.000	.000	.000	.000	.000	.000					
TOTAL NITRATES	MG/L-N	R	.670	.720	1.300	2.370	.775	.605	.655	1.040				0.02	10.000
		T	.780	.790	.540	1.790	.545	.515	.490	.955					
TOTAL SOLIDS	MG/L	R	198.00 CRO	177.00 CRO	209.00	240.00	216.00	176.00 CRO	188.00	218.00				2.0	500.000
		T	203.00 CRO	187.00 CRO	167.80 CRO	218.40 CRO	172.00 CRO	177.00 CRO	163.00 CRO	217.00 CRO					
TOTL TRIHALOMETHANES	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.2	350.000
		T	34.000	34.000	34.000	49.000	32.000	44.000	54.000	33.000					
TOXAPHENE	NG/L	R								.000 NP					NONE
		T								.000 NP					
TRICHLOROETHYLENE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.1	30.000
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W					
TRIFLUOROCHLOROTOLUE	UG/L	R	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W				0.1	NONE
		T	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W	.000 <W					
TURBIDITY	FTU	R	5.300	4.200	39.000	23.000	18.400	15.800	27.000	21.000				0.02	1.000
		T	.080 <T	.110 <T	.490 <T	.100 <T	.140 <T	.240 <T	.160 <T	.100 <T					

AMHERSTBERG WATER TREATMENT PLANT DWSP RESULTS

06/15/87

PARAMETERS	UNITS		SAMPLE DATE												DETECTION LIMIT	DRINKING WATER OBJ
			86/02/17	86/02/26	86/03/19	86/04/07	86/04/21	86/05/13	86/06/17	86/12/15						
URANIUM	MG/L-U	R T	.002 < .002 <	.002 < .002 <	.002 <	.002 < .002 <	.002 < .002 <	 .002 <	.002 < .002 <						0.1 UG/L	.020
URANIUM	UG/L-U	R T								.500 .200 <					0.1	
VANADIUM	MG/L-V	R T	.001 < .001 <	.001 < .002	.004 .001 <	.002 .001 <	.001 .001 <W	.001 .001	.001 .001 <W	.001 .001 <W					.5UG/L	NONE
ZINC	MG/L-ZN	R T	.007 .010	.006 .005	.011 .003	.043 .003	.006 .002	.003 .001	.004 .001 <W	.007 .019					.5UG/L	5.000

APPENDIX D

TERMS OF REFERENCE

Purpose

To review the present conditions and determine an optimum treatment strategy for contaminant removal at the plant, with emphasis on particulate materials and disinfection processes.

Work Tasks

1. Receive an information package from the MOE. Review the information provided and meet with the MOE staff, if required, to discuss the project.
2. Document the quality and quantity of raw and treated waters.
3. Define the present treatment processes and operating procedures. Prepare a progress report on Works Tasks 1-3 for the Project Committee.
4. Assess the methods of efficient particulate removal which would utilize the present major capital works of the plant. Evaluate the particulate removal efficiency and sensitivity of operation, assuming optimum performance of the plant.
5. Assess current disinfection practices and possible improvement methods.
6. Describe possible short and long-term process modifications to obtain optimum disinfection and contaminant removal.
7. Prepare a draft report for the project committee's review.
8. Prepare the final report.

1. RECEIVE AN INFORMATION PACKAGE FROM THE MOE. REVIEW THE INFORMATION PROVIDED AND MEET WITH THE MOE STAFF, IF REQUIRED, TO DISCUSS THE PROJECT.

Elements of Work

(a) Receive an information package from the MOE concerning the plant and the study. This package includes a general terms of reference, a general table of contents for organizing the study in a manner consistent with other plant reports, the WPOS reporting tables and a copy of Ontario Drinking Water Objectives.

(b) Review the information and prepare for a meeting to initiate the work on the project, including preparation of a schedule of manpower and staff committments.

(c) Meet with the MOE to discuss the available data, the terms of reference, and the project staff and work schedule. If a consultant is carrying out more that one study it may not be necessary to meet with the MOE at the start of each study.

2. DOCUMENT THE QUALITY AND QUANTITY OF RAW AND TREATED WATERS.

Elements of Work

(a) Prepare a monthly summary of maximum, minimum, and average flows for the last three consecutive years (Table 1.0). Address any discrepancies which exist between raw and treated flow rates.

(b) Based on the above, briefly review and tabulate for the last three years, the monthly maximum, minimum, and average per capita flow for the total population served by the plant (Table 1.1). Compare the plant data with typical per capita flows for the local region. Indicate major consumers who may influence the figures.

(c) Document the methods of measuring the raw and treated water flow rates.

(d) Summarize, for the last three consecutive years, where available, the raw and treated water; turbidity, colour, residual aluminum/iron, pH, temperature and treatment chemical dosages (other than disinfection and fluoridation). The summary should indicate the monthly daily average and maximum and minimum day (Table 2.0).

For the same three year period, tabulate also the daily average for the typical seasonal months of January, April, July and October as well as other months in which problems with particulate removal occurred (Tables 2). Document enough data to define and evaluate those problems.

Record other data, such as particulate counting, suspended solids, and algae counting (Table 5.0) which could reflect on particulate removal efficiency.

Document the source and methods used in determining all information.

A comparison should be made between the plant and outside laboratory information to ascertain the relative validity of the data. For plant data, emphasis should be given to plant laboratory tests rather than continuous process control instruments.

(e) Summarize for the last three consecutive years, where available, the disinfectant demand, dosages (including all disinfection related chemicals and residuals) for all application points as well as fluoridation dosage and residual. The summary should indicate the monthly daily average and maximum and minimum day (Table 3.0).

For the same three year period, tabulate (Tables 3) the daily average for the typical seasonal months of January, April, July and October as well as other months in which problems with chlorine residuals and/or positive bacterial tests identified in Table 6. Document enough data to define and evaluate those problems.

Document the methods of dosage evaluation and residual measurements, and establish the validity of the data provided.

(f) Prepare a summary, based on at least three years of data, of the raw and treated water quality testing data for physical, microbiological, radiological, and chemical water quality information (Table 4). Document as much data as is needed to show possible seasonal trends in water quality. Where possible, show corresponding sets of raw and treated water quality information.

Document the source and methods used in determining all water quality information and establish the validity of the data, comparing plant and outside laboratory data.

(g) Tabulate, for the last three consecutive years, the raw and treated water bacterial test information at the plant (Table 6).

Document the source and methods used for all data provided.

(h) Document the water sampling systems (source, pump, line-material and size, vertical rise velocity sampling location) used in the plant (similar to DWSP Questionnaire in Appendix A).

(i) Prepare a summary of inplant testing including Test, Sampling Point, Testing Frequency, Reporting Frequency, Testing Instrumentation including calibration.

(j) Identify other water quality concerns, not related to particulate removal or disinfection, which should be considered as part of the assessment phase of this evaluation program.

3. DEFINE THE PRESENT TREATMENT PROCESSES AND OPERATING PROCEDURES. PREPARE A PROGRESS REPORT ON WORK TASKS 1-3 (8 COPIES), FOR THE PROJECT COMMITTEE.

Elements of Work

(a) Where drawings are available, assemble sufficient record drawings of a reduced size, to document the general site layout and the interrelationship of major plant components. If available, include a process and piping diagram (PAPD) of the plant operations.

(b) Prepare a simplified block schematic of all major plant components including chemical systems and indicating design parameters. Appendix B is an example of the required standard schematic.

(c) Prepare a photographic record of the plant facilities, illustrating all of the major plant components and chemical feed systems. The record should include approximately 30-40 coloured (9 cm x 12 cm) (or 10 cm x 15 cm) prints, suitably labelled. The progress and draft reports may include photocopies in lieu of the prints.

(d) Tabulate the design parameters for all the major plant components, with emphasis on the process operations, including chemical feeds. This information, as a minimum, must be consistent with the DWSP Questionnaire (Appendix A) and must be confirmed and verified by field observations. The design parameters should be evaluated at design, rated and actual operational flows.

(e) Prepare a summary of how the plant is operated, including chemical dosage control, such as jar testing information, filter backwashing procedures and initiation, and pumping and flow control.

(f) Document all reported and other apparent problems in plant operations and/or in the distribution system related to water quality. In addition list the health related parameters which exceed the Ontario Drinking Water Objectives (Table 7).

(g) Submit 8 copies of the progress report to the Prime Consultant for distribution to the Project Committee.

4. ASSESS THE METHODS OF EFFICIENT PARTICULATE REMOVAL WHICH WOULD UTILIZE THE PRESENT MAJOR CAPITAL WORKS OF THE PLANT. EVALUATE THE PARTICULATE REMOVAL EFFICIENCY AND SENSITIVITY OF OPERATION, ASSUMING OPTIMUM PERFORMANCE OF THE PLANT.

Elements of Work

(a) Assess the validity and implication of all information relating to particulate removal provided in Work Tasks 1 and 2 with emphasis on method, metering and sampling, etc.

(b) Using information provided in Work Tasks 1, 2 and 3 evaluate the plant's particulate removal efficiency. The basis of minimum particulate removal should be 1.0 F.t.u. It should, however, be recognized that it is desirable to strive for an operational level which is as low as is achievable.

(c) Conduct an evaluation of possible optimum performance alternatives. Include jar testing using established industry practice.

(d) Evaluate the feasibility of optimum removal using the existing plant capital works. This evaluation should consider the worst case water quality conditions, even though field testing data may not be available during the initial phase of the study (see Work Task 7).

(e) Describe the operational procedures, management strategies, and equipment required for various feasible alternatives. Estimate chemical dosages, level of operational expertise, and sensitivity of operation of the alternatives.

5. ASSESS CURRENT DISINFECTION PRACTICES AND POSSIBLE IMPROVEMENT METHODS.

Elements of Work

(a) Assess the validity and implication of all information relating to disinfection provided in Work Tasks 1, 2 and 3 with emphasis on method, metering and sampling etc.

(b) Using the information provided in Work Tasks 1, 2 and 3 evaluate the plant's ability to disinfect the water. The basis of minimum disinfection should be to ensure a water quality as described in the Ontario Drinking Water Objectives.

(c) Conduct an evaluation of possible optimum disinfection procedures for the plant, with consideration also given to the reduction of chlorinated by-products in the treated water.

(d) Evaluate the feasibility of the various alternatives using the existing plant capital works.

(e) Assess the relative merits of the alternatives. Describe the operational procedures, management strategies, and equipment required for the feasible alternatives. Estimate chemical dosages, level of operational expertise, and sensitivity of operation for the alternatives.

6. DESCRIBE POSSIBLE SHORT AND LONG-TERM PROCESS MODIFICATIONS TO OBTAIN OPTIMUM DISINFECTION AND CONTAMINANT REMOVAL.

Elements of Work

(a) Prepare a list of modifications which should be considered for detailed implementation evaluation. Provide an estimated cost and possible schedule for implementation for each of the proposed modifications.

It is not the purpose of this study to provide a detailed implementation scheme for plant rehabilitation. It is, however, necessary to scope the feasible short and long-term process modifications required to achieve optimum disinfection and contaminant removals.

(b) Incorporate (a) above in the draft report.

7. PREPARE A DRAFT REPORT FOR THE PROJECT COMMITTEE'S REVIEW. (8 COPIES).

Elements of Work

(a) The report must include all information for Work Tasks 1-6.

The information must be organized and presented in a logical and co-ordinated fashion. A general table of contents (Appendix C) is provided for organizing the material in a manner consistent with other plant reports.

Submit the draft report for review by the Project Committee.

(b) Meet with the Project Committee on site at least one week after submission of the report.

(c) Prepare a separate letter report containing recommendation(s) concerning the need for additional field testing to cover quality conditions not available during the period of this study. The Project Committee may decide to delay completion of the final report until field data can be obtained to confirm the predictions of performance for the worst case water conditions.

8. PREPARE THE FINAL REPORT.

Elements of Work

(a) Conduct additional field testing if required. Discuss the implementations of the results with the Project Committee if the results differ from the predicted performance.

(b) Amend the report as per review comments, incorporating additional field data if required.

(c) Submit 25 copies of the final reports (including the colour photographs) to the MOE for distribution.